A McGRAW-HILL PUBLICATION

Chemical Week

Tranquilizer makers on trial. Antitrusters, Senate probers deliver indictments. . . p. 17

Structural steadiers – new coatings, laminates soak up equipment vibrations . p. 31

Optimistic oxo makers boost capacity despite slow-growing demand . . . . . p. 41

New role for chromatography: commercial output of extra-pure research chemicals . p. 51

Critical: atomic liability protection . . . . . p. 85

February 6, 1960

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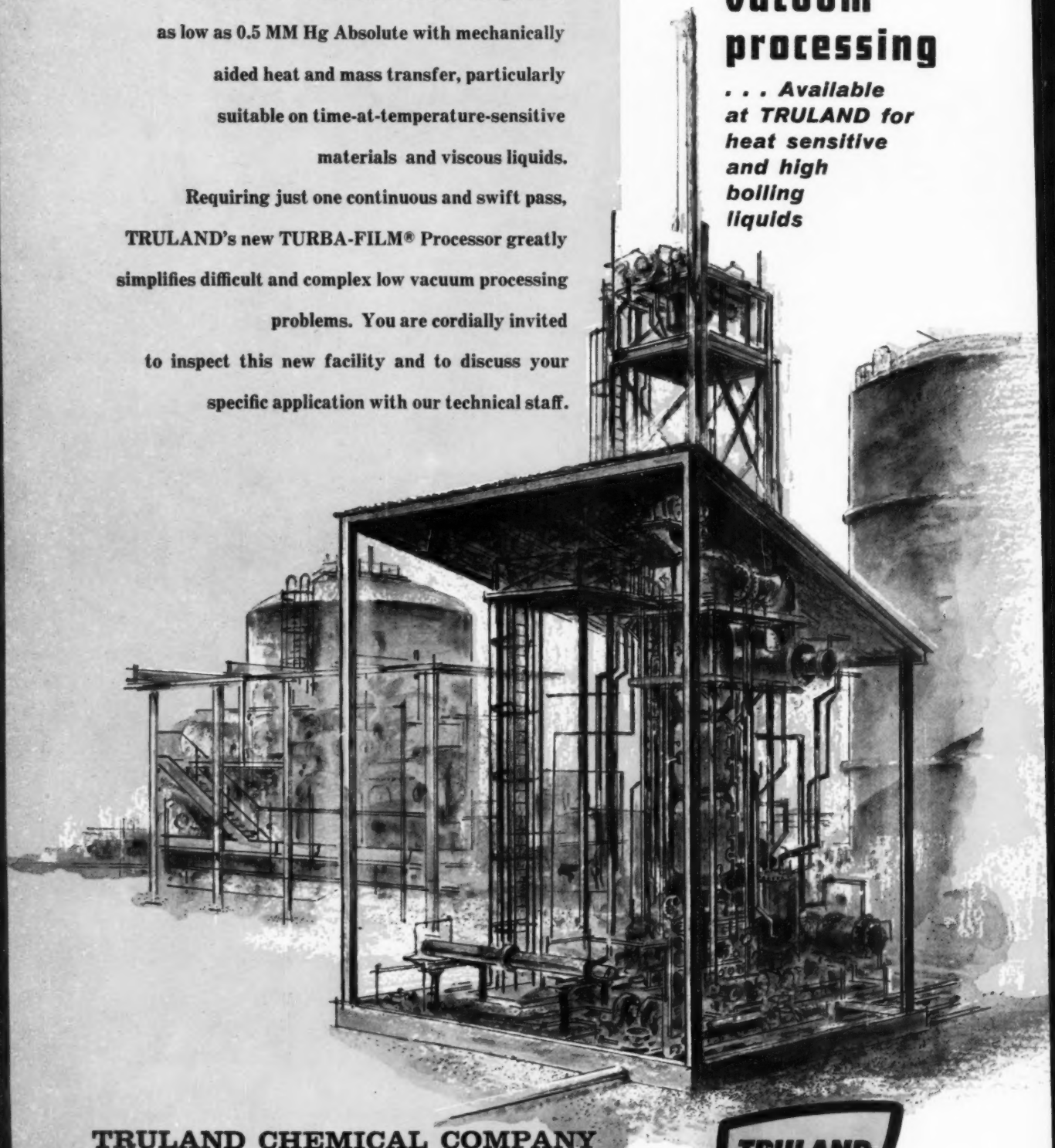

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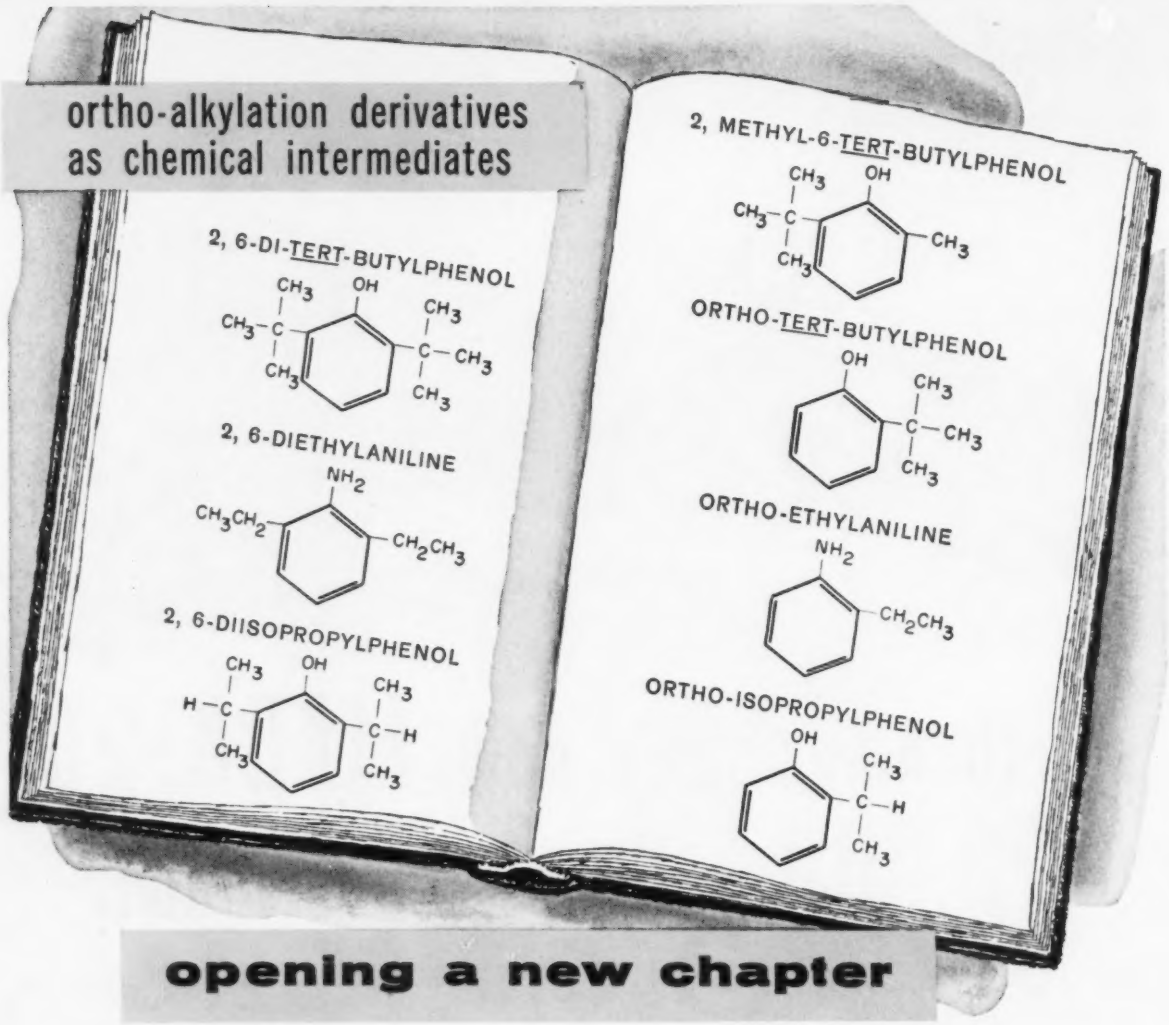

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Chemical Week

TOP OF THE WEEK

FEBRUARY 6, 1960

- **Inside Russia's chemical industry:** some segments boost output —but over-all gains fall short of goals ..... **p. 18**
- **Soap industry's '60 merchandising outlook:** new packages, new formulations, few new products ..... **p. 36**
- **New continuous microcrystalline wax decolorization process** cuts costs, features solids-transfer system ..... **p. 59**
- **Congressional hearings on food additives** worry pesticide makers. Prospect: stricter federal control ..... **p. 73**

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Kefauver's assault on tranquilizer producers could lead to constructive legislation—if lawmakers don't try to "legislate" economic miracles.

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18 Russia's chemical industry gets Kremlin blessing for gains, despite over-all failure to meet goals.

19 Rash of U.S.-Japanese chemical ventures expected—Japanese government may ease foreign-capital restrictions.

19 Syndet-maker Onyx Chemical will "go public" after 50 years as family-owned enterprise.

20 Slumping chemical stock prices—trend is reaction to "overselling."

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LETTERS

Morton Makes Acrylics

TO THE EDITOR: We noted with great pleasure that your publication (*June 13, '59, p. 121*) recognized our company as supplying Simoniz Co. with "most of its polystyrene polymer requirements." Because of this recognition, it was extremely puzzling to me, when reading the article "Emulsion Makers Map New Acrylic Growth (*Dec. 19, '59, p. 37*), to note that Morton Chemical was no longer considered . . . as being in the polymer emulsion business . . . Morton has been, continues to be and intends to remain in this field. . .

We hope that . . . our existing and prospective customers realize that our production facilities are located in Ringwood, Ill., some 57 miles northwest of Chicago. . .

GLENN C. ANDERSON
Advertising Manager
Morton Chemical Co.
Chicago

We agree that the chart on the page to which Reader Anderson refers is misleading in that it appears to be a complete listing of U.S. acrylic emulsion plants. In the text we said, "Eight major commercial producers are currently vying for the acrylic emulsion business . . . Their output is augmented by that of two other companies with plants supplying their own captive requirements, in addition to production by several smaller plants." —ED.

Another Way to Finance

TO THE EDITOR: Your article on automotive leasing "Route to Lower Costs" (*CW, Dec. 26, '59, p. 53*) is a highly interesting and informative one, but it contains several questionable statements on which I would like to comment.

One of the most frequently used arguments for leasing is that "leasing does not tie up large chunks of working capital." It is followed, as in your article, by comparisons relating average pretax profit to average working capital. Taken at face value, this would seem to infer that companies earn nothing on their investments in fixed assets. . . .

Leasing is just another form of debt financing. It differs from other forms in that it adds a third party to the transaction. This third party

VIEWPOINT

Why Not Repeal It?

"IF THE LAW OF SUPPLY AND DEMAND is causing inflation," one alarmed citizen wrote to his congressman recently, "why don't you folks in Congress just repeal that law?"

Obviously, some people have too much faith in the omnipotence of our law-making bodies. This being the case, it's to be hoped that Senator Kefauver—who has been telling the nation that "something ought to be done" about pharmaceutical companies' pricing and licensing policies *(see p. 17)*—will sooner or later take pains to make it clear that even the U.S. Congress, with all its prospective Presidential candidates, may not be able to devise a swift and perfect solution to all the drug industry problems that he has been hurling into the headlines.

One of those problems seems to make Mr. Kefauver wish that it were possible to repeal—or at least amend—the law of supply and demand. Asserting that in one case a drug tablet costs only 1.6¢ to produce but is sold to a patient for 29.8¢, the senator declared: "I believe the industry and Congress have an obligation to find some way that this very large spread can be reduced."

Certainly almost everyone is opposed to high prices and inflation in general. One way in which a government can strive to reduce prices is to harden the currency (tight-money policies); another is to enact an all-encompassing price control law and try to enforce it. But a government can't very well legislate away the real worth of a commodity that—like tranquilizing drugs—is genuinely useful, performs a valuable service, or is desired for legitimate comfort or pleasure. If a truly wanted product is sold to certain buyers at only a fraction of its actual market value, the stage is set for black-market resale deals.

Mr. Kefauver no doubt is sincere in his concern for low-income people—including those who are unemployed or underemployed because of age or physical or mental disability—and who need considerable quantities of prescription drugs. No one wants to deprive anyone of opportunities for health, comfort, and productive employment. But to what extent should ethical drugs be regarded as a special case? People also need food, clothing, and shelter; but up to now, at least, Senator Kefauver has not demanded that farmers and carpenters sell their goods and services for only 5% more than their operating costs.

Also, the senator has been contending that licensing contracts between pharmaceutical companies have permitted these companies to shut out competition and charge prices that are unjustifiably high relative to production costs; and that this calls for either new legislation or vigorous enforcement of present laws. In this contention, he received support last week from the Justice Dept., which filed its suit against two tranquilizer producers at the very moment that their officers were taking turns on the Kefauver committee's witness stand.

Under the present system—with which Mr. Kefauver says he is so acutely dissatisfied—how well are the pharmaceutical companies doing their job? One answer that seems meaningful comes from President William Graham of Baxter Laboratories, who last week declared: "Today, all foreign countries put together do not produce one-half as many potent new chemical entities as the U.S. pharmaceutical industry."

If the patent laws and antitrust laws are in conflict—as last week's antitrust suit seems to indicate—wouldn't the senator be performing a worthwhile service by introducing legislation to resolve that conflict in such a way that U.S. companies still have incentive to create and produce?

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LETTERS

must make a profit—and this makes leasing more expensive than other types of debt financing. Yet, as you point out, many companies do lease, and their major reason has to be that the operating advantages more than offset this extra cost. Leasing companies provide a service, but let's be sure what the service is.

FRANK S. LYNDALL
Treasurer-Secretary's Dept.
Atlas Powder Co.
Wilmington

CW's *article attempted to define just what services leasing companies do provide.*—Ed.

No Change Sought

TO THE EDITOR: In your tabulation of six strikes and the action sought by management (*Dec. 19, '59, p. 43*), you erroneously list American Oil at Texas City as asking for changes in work rules. The fact is the company did not make one single demand; it offered to renew, word for word, the contract that has been in effect two years.

The union called the strike [longest refinery strike on record] to support demands that it be given a voice in writing job descriptions, making job assignments, and similar functions.

The company is determined to hold onto these historic management rights that have been a part of every contract with OCAW Local 4-449. To yield to the union's unrealistic demands would lead to "featherbedding". . . .

B. F. BABIN
Plant Manager
American Oil Co.
Texas City, Tex.

MEETINGS

Chemical Market Research Assn. meeting, Lord Baltimore Hotel, Baltimore, Md., Feb. 17-18.

National Chemical Credit Assn. seventh annual meeting, Sheraton Hotel, Philadelphia, Feb. 17-19.

American Institute of Chemical Engineers, national meeting, Biltmore Hotel, Atlanta, Ga., Feb. 21-24.

Technical Assn. of the Pulp and Paper Industry, annual meeting, Commodore Hotel, New York, Feb. 22-25.

Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Penn-Sheraton Hotel, Pittsburgh, Feb. 29-March 4.

AMMONIA

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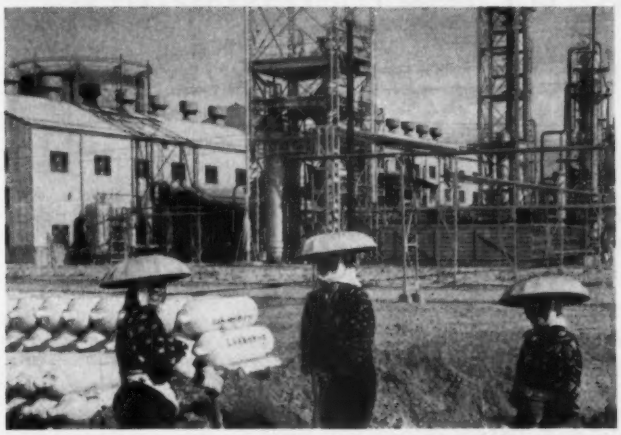

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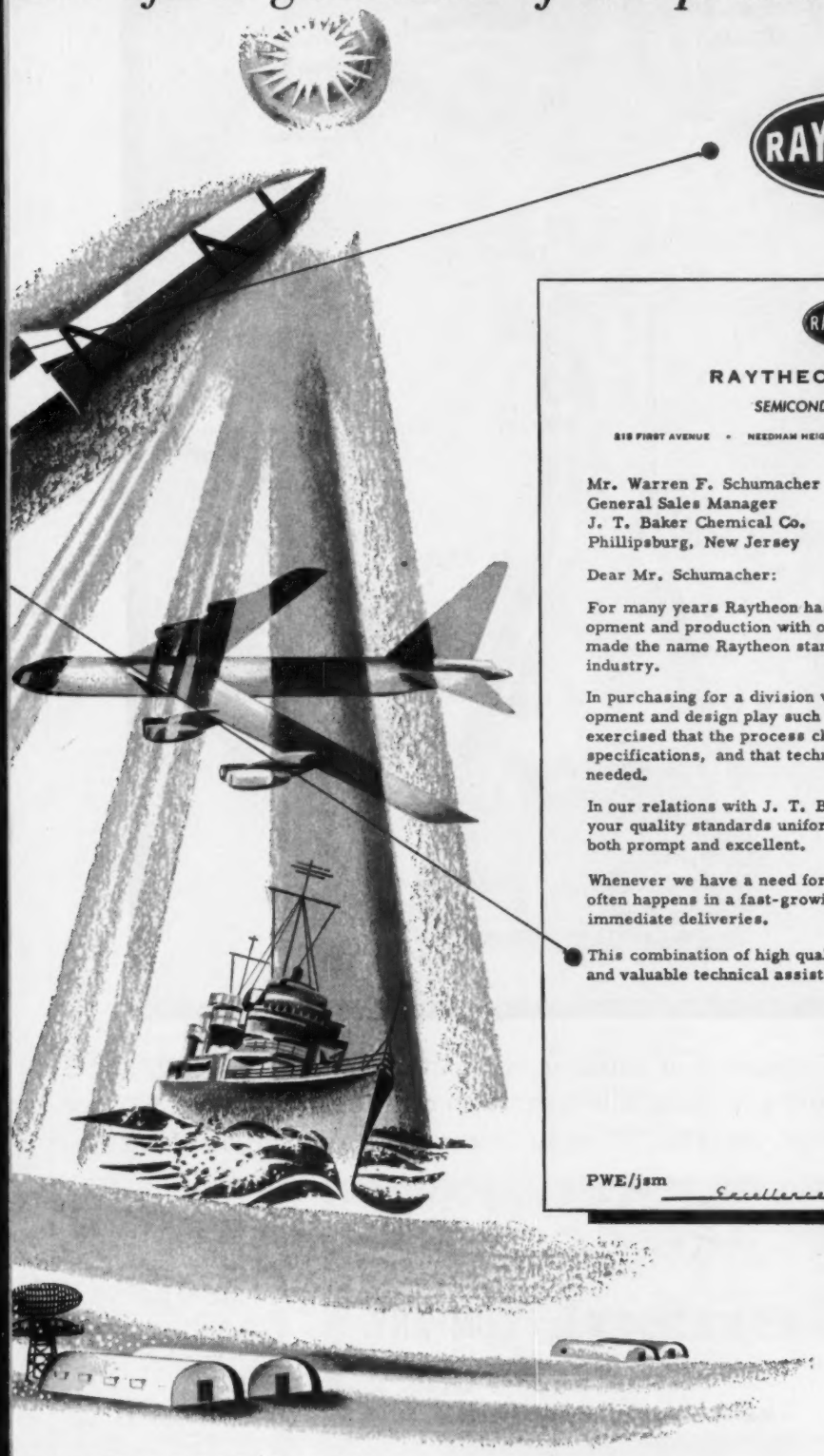

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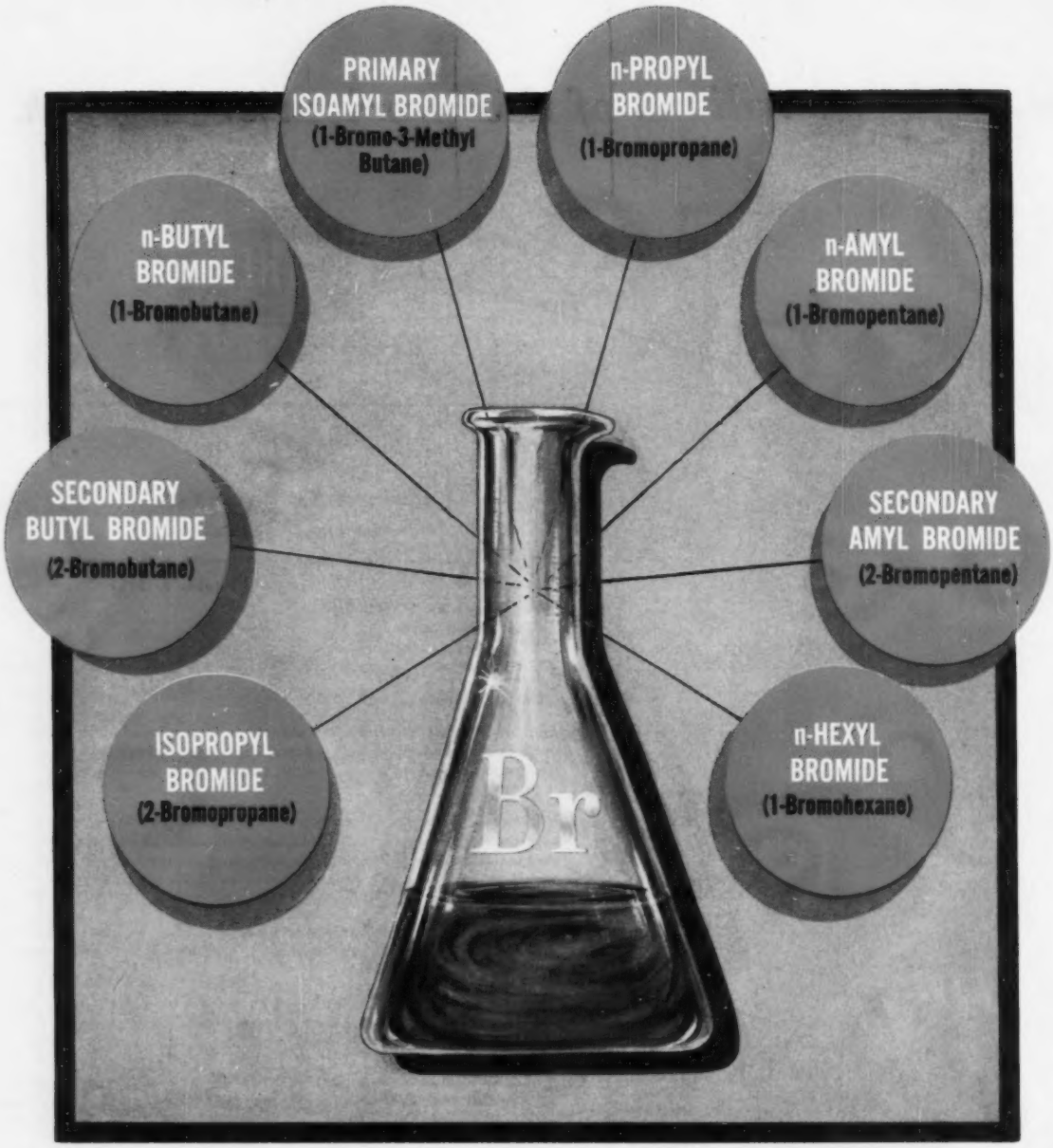

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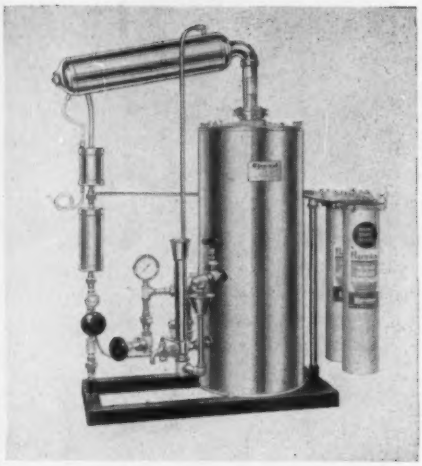

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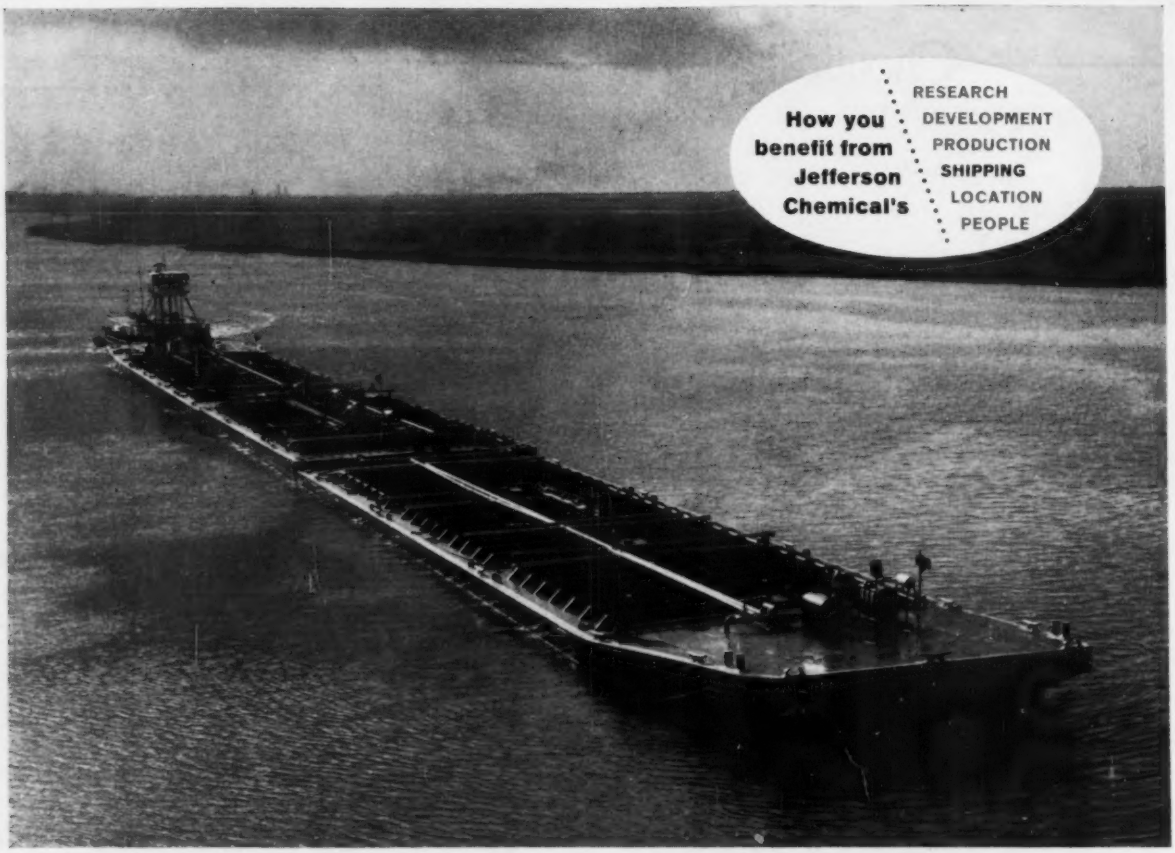

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169

Business
Newsletter

CHEMICAL WEEK
February 6, 1960

Highest-yet sales and earnings data coming out this week shows that the 3½-month steel strike hampered but definitely did not cripple chemical industry operations last fall.

Look at Union Carbide, for example. During the strike, Carbide's sales of alloys, electrodes and industrial gases were affected; and for several months after the strike, sales of chemicals and plastics were off, due to shortages of steel supplies in the auto and other industries. Nevertheless, Carbide's fourth quarter was an all-time record; sales hit $410 million. For the year as a whole, sales mounted 18%, to $1,531.3 million; and earnings climbed 37%, to $171.6 million.

Performances of other leading chemical concerns in '59 generally paralleled Carbide's gains: Air Reduction, sales up 14.4%, to $200.6 million, earnings up 11.2%, to $14.8 million; Hercules Powder, sales up 20%, to $283.6 million, earnings up 34%, to $23.5 million; Monsanto Chemical, sales up 12.3%, to $615.4 million, earnings up 41.8%, to $49 million; Stauffer Chemical, sales up 8%, to $229.5 million, earnings up to 23%, to $22.2 million.

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W. R. Grace gets a double bonus with control of Cosden Petroleum: a broader base for petrochemical expansion, and healthy dividends —currently $1/year/share—out of Cosden's annual earnings of about $6 million.

Grace already is in petrochemicals, producing high-density polyethylene at Baton Rouge, La. Cosden—primarily a petroleum refiner—is plunging ahead in petrochemicals. Styrene capacity will be tripled this year to 60 million lbs./year; and Cosden—which claims to be the world's only supplier of 99% ortho-xylene in commercial quantities—expects to double capacity by early '61, boosting production to 70 million lbs.

Several years ago, a Grace-Cosden merger move fell flat. On this second attempt, Grace received tenders of slightly more than 51% of Cosden's outstanding shares within 20 days (Grace offered $25/share).

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Philadelphia and Reading still says it will make chemicals from coal wastes—despite last week's decision by General Dynamics to drop out of what would have been a joint venture. And the project—once tabbed at $100 million (*CW, May 30, '59, p. 69*)—has now been boosted to $130 million, according to P&R executives. The plant will utilize the company's vast anthracite wastes around Pottsville, Pa., turn them into chemical products, for which P&R says it already has customers. Awarding of plant contracts is expected within the next few days, and ground is to be broken in March.

Business
Newsletter

(Continued)

Jefferson Chemical Co. is raising its petrochemical stake: The company has just acquired Gulf Oil's manufacturing facilities at Conroe, Tex., for intermediate-scale production of new products out of its Austin, Tex., research labs. New processes, pilot-planted at Austin, will be further developed on a larger scale at Conroe. Case in point: a new process for morpholine, used in rubber chemicals and corrosion inhibitors. Also slated for production at Conroe: polyurethane intermediates and "specialty surface-active agents." Under the new ownership the plant is expected to be onstream by mid-'60.

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Rayon tire-cord producers may soon be reckoning with a new force in the nylon tire-cord market. Dow Chemical will build a 12-million-lbs./year plant at its James River Division near Williamsburg, Va., to produce nylon-6 filament yarn, mainly for tire cord. Construction of the multimillion-dollar plant will be started this March; completion is targeted for late '61.

Caprolactam for the new venture will be produced at Freeport, Tex., by Dow-Badische, an affiliated company; and process know-how and equipment has been purchased from H. Zimmer Co. (Frankfurt, West Germany).

Dow's entry into the field will mean that three big firms will be pushing nylon tire cord. But rayon cord producers are compiling Tyrex test data made "at use level," are "extremely pleased with the results." This data will be published soon.

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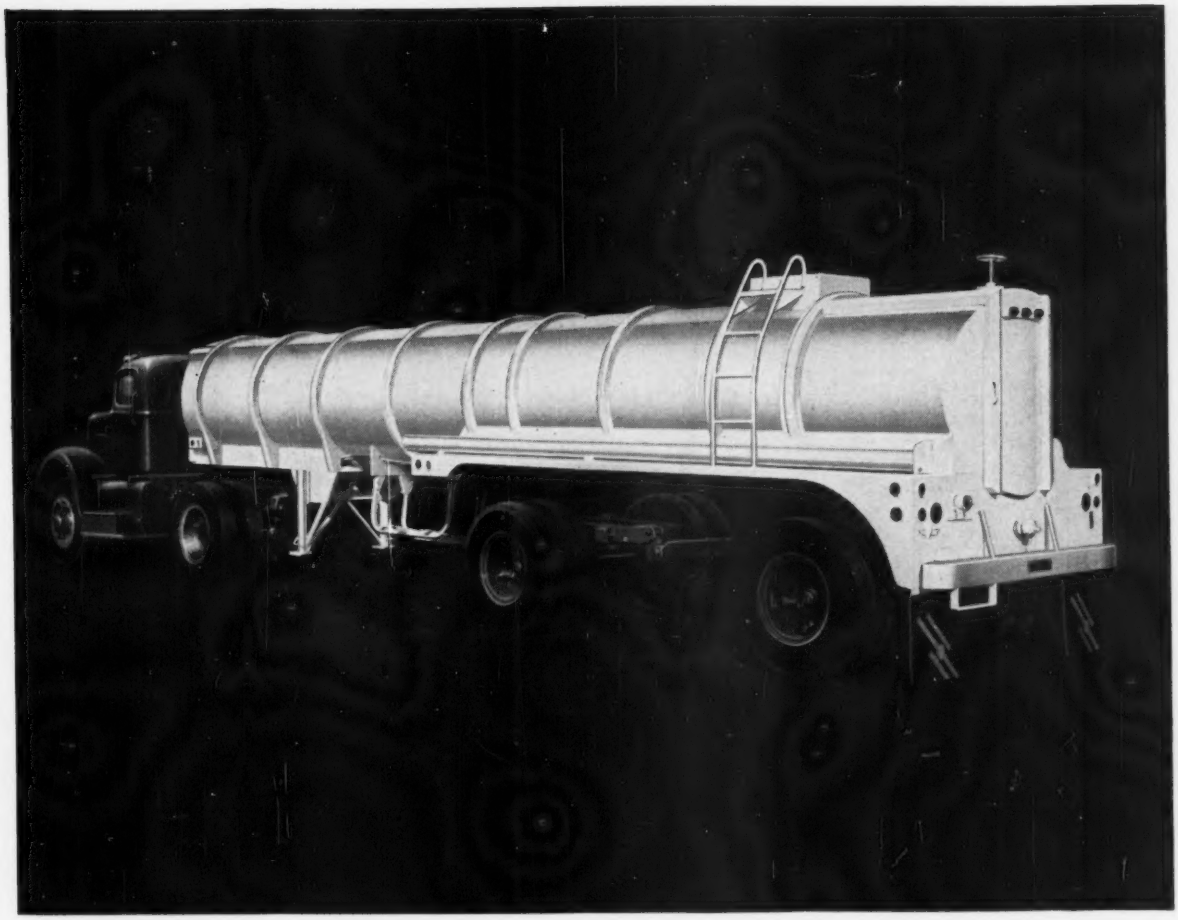
U.S. carbon black producers are pooling resources to set up overseas plants. Latest venture links Columbian Carbon Co. and Continental Carbon Co. (the Witco Chemical-Continental Oil subsidiary), embraces the 25-million-lbs./year plant Continental is building in Rotterdam, and Columbian's 60-million-lbs./year plant going up at Trecate, near Milan. Columbian has bought into the Rotterdam plant, which will be operated as Continental-Columbian Carbon (Nederland) N.V. Continental, in turn, has bought part of the Italian plant, which will be called Columbian Continental Europa, S. A. The arrangement, the producers emphasize, is not designed to "split markets." Output of each plant will be sold "competitively" by both parent companies' sales organizations.

Continental is tied up with another U.S. competitor—Phillips Petroleum—in a 56-million-lbs./year venture now under construction at Bordeaux, France. And two other producers linked up last year when United Carbon purchased a share of Godfrey L. Cabot's Australian plant, which went onstream last fall.

United, incidentally, will build another plant abroad. It's forming a subsidiary, United Carbon-France, to put up a $5-million, 50-million-lbs./year plant at Port Jerome, near Rouen. Initial output will be the higher grades of reinforcing blacks, for the rubber fabricators concentrated in northern and central France.



"Flexi-Trac" Adaptability

MEANS MORE PAYLOAD PLUS OPERATING ECONOMY

Hauling more than 100 extra gallons of caustic soda every trip, this custom built chemical transport typifies the advantages Standard Steel users are getting with the new "Flexi-Trac" widespread running gear. "Flexi-Trac" is adaptable to nearly any tank design because it is self-contained. It requires no tractor attachments and has no forward structure to interfere with pipe lines and accessories.

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This high efficiency builder for liquid detergents, soaps and cleaning compounds is soluble 210 parts in 100 parts water at 75° F. It exhibits its exceptional synergistic, sequestering, water softening, dispersion and emulsifying properties. We pack it powdered or unground in 100 lb. lined bags and in 125 and 300 lb. drums. All Blockson jobbers warehouse it. Write for Technical Bulletin, sample.

BLOCKSON **BLOCKSON CHEMICAL COMPANY**
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Carter Products' Hoyt . . . vs. . . . Justice Dept.'s Rogers:

'We deny the charges in full. We have always conducted our business legally and properly in all respects.'

WIDE WORLD

'Competition in meprobamate drugs has been eliminated. The public has had to pay artificially high prices.'

Tranquilizer Makers on the Spot

The free-wheeling U.S. drug industry, which has grown and spawned new products at a phenomenal pace since World War II, discovered again last week that success has its built-in handicaps. While tranquilizer producers were defending their profits before Senate investigators, the Justice Dept. in New York was serving the makers of Miltown and Equanil with an antitrust suit.

The timing of the Justice Dept. suit against Carter Products, Inc., and American Home Products Corp.—it was filed the day Carter's President Henry H. Hoyt faced the Kefauver committee and the day before American Home Products' Chairman Alvin G. Brush was set to testify—sparked considerable speculation. Kefauver, of course, was delighted—the Justice Dept. was substantiating committee charges that the companies had tried to dismiss as "reckless."

But, as far as could be learned, the committee and Justice had not collaborated. The committee had given Justice no information from its files and was surprised by the report of the antitrust action. Justice officials claim the timing was pure coincidence; the case just happened to be ready that day.

But the department had been investigating drug firms for more than a year. Two possible explanations offered by observers: (1) the antitrusters are cashing in on the headlines produced by the committee; (2) the Republican Attorney General is emphasizing that the Democrats in Congress are not the only watchdogs of the people's interests.

The Justice Dept. blasted the two drug firms on three counts: (1) price fixing; (2) restricting use of the meprobamate (Miltown and Equanil) patent (U.S. 2,724,720) to themselves —Carter licenses only American Home Products; (3) agreeing to mutually determine who else can use meprobamate as an ingredient in other drug preparations. The department says this discourages development of new drugs.

Both companies emphatically denied the government's charges, indicated they would contest the suit. About Carter, Hoyt said, "We have always conducted our business legally, fairly, and properly in all respects." Brush said his firm always considered itself to be "in strict compliance with the antitrust laws."

A civil court decision in favor of the government could mean that Car-

WIDE WORLD

American Home Products' Brush: 'Always in strict compliance.'

ter would have to dedicate its patent rights to general use, or license all qualified applicants upon payment of reasonable royalties.

Kefauver gave important clues to the ammunition the antitrusters will bring into the fracas. He charged that the two firms have "invariably" submitted identical bids on meprobamate, "down to a thousandth of a cent," in sales to government hospitals. He further alleged that prices to drugstores are identical. He said it was difficult to understand this, when American Home Products' costs are double Carter's, because of the royalties the former must pay. Hoyt replied that Carter charges the government a "standard price," never has prior price discussion with American Home Products.

"Extraordinary Profit": The senator emphasized that the allegedly "administered" price has yielded extraordinary profits for the two firms. He said Carter profits 30% on the sale of each tablet of Miltown and 12% on aggregate sales of all products, compared with manufacturing industries' average of 5% profit on sales.

Hoyt's answer: he did not consider these few years' profits extraordinary, when they resulted from 13 years of research. Moreover, the company always faced the possibility that its leading product could become obsolete next week.

Other statistical salvos by Kefauver: profits of 40% on net worth, compared with the manufacturing industries' average of 11%; net profits before taxes on all products, 20%, compared with an average of 13% for 20 drug companies.

In hearings earlier in the week, Smith Kline & French was said to make comparable profits on its high-potency tranquilizers, Thorazine and Compazine.

The committee plans a more general attack on the drug industry, when hearings resume Feb. 23. Representatives of the industry as a whole, including Pharmaceutical Manufacturers Assn. President Austin Smith, will testify. Following that, the investigators will get back to specific products—first antibiotics, then vitamins, perhaps vaccines and antidiabetic drugs later.

Shadow Area: Clues to the kind of legislation the committee might recommend began to emerge as the hearings wore on. Kefauver is keenly interested in the advertising and promotion practices of the big drug houses. He feels that there is a shadow area of responsibility between FTC, charged with cracking down on deceptive ads, and the Food & Drug Administration, which has the technical knowledge of what the drugs can and can't do. He thinks this area of responsibility needs to be defined.

He is also giving thought to requiring advertising material to be submitted to FTC for approval in advance. Whether patents should be made more generally available will get more attention as the hearings move on.

Also under consideration: requiring prescriptions to be given in generic names, instead of tradenames, so purchasers can buy less-costly brands. The medical profession would join drug houses in fighting this proposal, however, and it is doubtful that such a law could be enforced.

In the Act: Justice was not the only agency whose interest had been kindled by the Senate hearings.

Pressure was on FTC to take a sharper look at drug advertising. Two medical researchers, Heinz E. Lehmann of Montreal and Fritz Frehan of Delaware State Hospital, testified before Kefauver's Antitrust Subcommittee that tranquilizer advertising is often misleading. They said it fails to warn physicians that the mild tranquilizers could cause addiction and severe withdrawal symptoms; that, in fact, these drugs were sometimes advertised as nonaddictive.

Until recently, FTC has virtually ignored advertising to the doctor and druggist on the grounds they were experts and would not be easily misled.

FTC's role could become active on very short notice. One commissioner points out that FTC moved swiftly against record makers and distributors, after a House committee exposed the payola shenanigans.

FDA, also, could become involved. It is responsible for seeing that explanatory brochures accompanying new drugs, like labels on patent medicines, contain full information for the doctor.

At any rate, the drug industry is learning fast that it must pay more attention to Washington agencies from now on.

And it's certain, whatever the concrete results of the Kefauver probe, drugmakers' pricing practices will now come under the same kind of public scrutiny that has long existed in steel and other industries.

Soviet Speedup

Piecemeal details of Soviet chemical industry progress—revealed last week by the U.S.S.R.'s Central Statistical Board—give a picture of a machine steadily picking up speed. Some key parts seem to be moving at an impressive rate; but the speed of the machine as a whole is not accelerating fast enough to please Soviet planners.

According to U.S. government sources, Russia's chemical industry as a whole failed to meet the '59 target of a 17% rise, increased production by only 10% (*CW Business Newsletter, Jan. 30*). Despite the Kremlin's official tone of self-satisfaction, its new detailed figures don't refute the U.S. estimate.

Plastics Goal Topped: The Russians point to "overfulfillment" of '59 goals in certain limited sectors. Output of one key group on the Russians' agenda, synthetic resins and plastics, for example, is said to have exceeded '59 goals—for the group as a whole, and "for many major types." The group's output rose 13% over '58, including a 40% boost in carbamide resins for plywood and furniture, and a 24% increase in out-

put of polyvinylchloride resins and copolymers.

Targets are also said to be exceeded for synthetic fatty acids, up 57%; and synthetic ethyl alcohol, up 36%.

Production of synthetic ammonia from natural gas "has been mastered," output of synthetic rubber and alcohol from nonedible raw materials has "gone up considerably," and the "plan for production of mineral fertilizer, caustic soda, and auto tires was also fulfilled ahead of time."

Skimpy Statistics: As usual, actual production figures are skimpy: sulfuric acid, 5.1 million tons; artificial and synthetic fibers, 179,000 tons; auto tires, 15.5 million. All of these are said to have overshot the target.

More significant for the long run, production of chemical equipment is listed as falling below '59 goals. Value of production is listed as 1.7 billion rubles—$425 million at the official exchange rate. For the entire seven-year plan, 100-105 billion rubles are earmarked for equipment production.

In addition to having trouble making enough equipment, the Russian planners reportedly are having a hard time getting plant managers to install the equipment that is available. Many of them are more worried about fulfilling short-run production quotas than achieving long-run efficiency.

$14-Million Atomic Job

Another milestone in growth of the nuclear materials processing industry: Mallinckrodt Nuclear Corp. (St. Louis), wholly owned subsidiary of Mallinckrodt Chemical Works, will furnish about 1,000 kg. of 93% uranium oxide to Consolidated Edison's Indian Point, N.Y., atomic power plant, now under construction.

The atomic fuel, which will come from the Atomic Energy Commission's Oak Ridge facilities, is valued at about $14 million. It will be processed by Mallinckrodt at its Hematite, Mo., plant, then shipped to the nuclear fuel plant of the Babcock & Wilcox Co. at Lynchburg, Va. At Lynchburg, the dioxide will be mixed with thorium oxide and made into fuel element pellets for Indian Point's pressurized-water reactor.

Mallinckrodt is to make first shipment to Indian Point—some 30 miles up the Hudson River from New York City—in early March. Deliveries are scheduled periodically until completion of the contract in late '60.

So far, Mallinckrodt—the first U.S. company to process uranium for use as commercial nuclear fuel—has processed more than 300,000 lbs. at Hematite for atomic reactors such as the one at Vallecitos; the nuclear ship *N. S. Savannah;* Britain's first nuclear submarine, the *Dreadnought*; and West Germany's first power reactor at Kahl—in all, nearly 100 reactor projects here and abroad.

Con Edison has scheduled startup of the nearly $100-million plant for the spring of 1961.

Onyx Stock Goes Public

Onyx Oil & Chemical Co. (Jersey City, N.J.)—family-owned for 50 years—is about to become a publicly owned corporation. A successor company, incorporated Dec. 10 as Onyx Chemical Corp., has acquired an option to purchase all outstanding stock of the old company at an aggregate price of $2.5 million.

Onyx was founded in 1910 by the late Victor H. Berman, who managed the business until his death in '53. Since then the business has been owned by individual members of his family and by a trust for the benefit of family members.

The new Onyx Chemical is authorized to issue 200,000 shares of common stock, of which 40,000 are outstanding. Owners: McDonnell & Co. (20,000) and F. O. Robitschek, president and director of the new company (20,000 shares). An additional 140,000 shares of Onyx Chemical common stock are being offered to the public.

Onyx products (most of which are surface-active agents) are consumed by about 50 different industries. Last year's breakdown of sales, by dollar volume: alkyl sulfates, 31.6%; quaternary ammonium compounds, 20.9%; alkanolamides, 11.8%; ethoxylated products, 7.3%; and resin and polymer catalysts, 5.3%.

Onyx sales for the 11 months of '59 totaled $4.6 million, compared with $4.1 million for all of '58. Net income through Nov. 30, '59; $210,806, compared with $96,836 for all of '58.

Missions to Tokyo

Easing of foreign investment restrictions in Japan—as now predicted by industry sources there—will likely result in a flurry of joint chemical ventures by U.S. and Japanese companies.

It's now reported that the Japanese government's Ministry of International Trade and Industry (MITI) wants to fortify domestic chemical producers, encourage foreign investments and international competition —rather than simply fulfill domestic demand. And MITI is said to be urging the Finance Ministry to soften its long-standing regulation that foreign capital must not have more than a 30% holding in any Japanese enterprise.

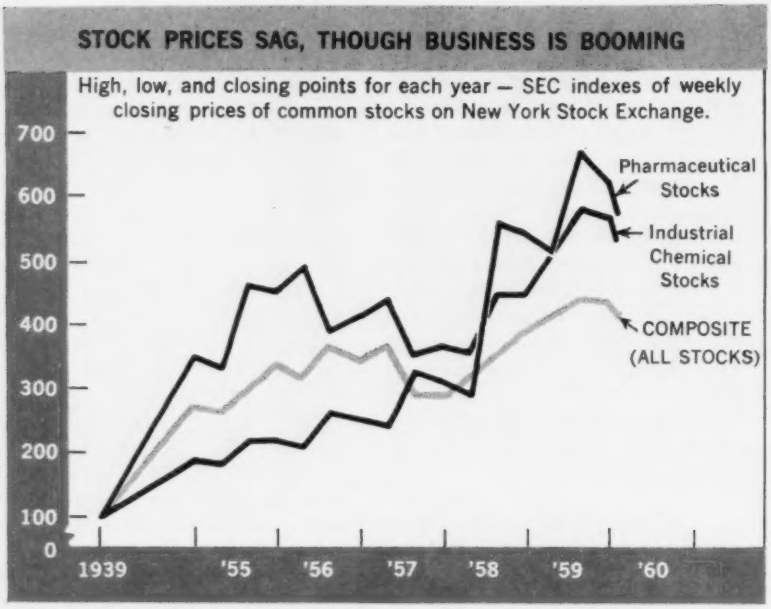
The aim is to attract foreign companies—especially U.S. firms—that will exchange know-how for equity shares in new ventures.

Various U.S. and Japanese firms are said to be deep in negotiations. Du Pont and Showa Denko, one of Japan's leading fertilizer manufacturers, were reported to be setting up a subsidiary for neoprene production. Estimated cost: $6.5 million. Du Pont would supply half the capital.

This week, Du Pont confirmed it is planning such a venture, but added that negotiations have not yet reached the stage at which the company could disclose the terms. The latter will depend on "the type of arrangement the government will authorize." Du Pont adds that Showa Denko is now asking government approval of the neoprene project.

Another joint venture in the planning stages involves Oronite Chemical and Nippon Petrochemicals. Oronite says it has filed with the government plans for a 15,000-tons/year detergent alkylate facility in which Oronite would have a 45% interest. Japanese sources have set plant costs at $1.1 million, but Oronite will not confirm the figure. It is awaiting go-ahead from the Japanese government.

It's also reported from Japan that Union Carbide has been invited to participate in a polyethylene project with Mitsui Chemical, but Carbide, up to now, has not confirmed this report. Du Pont, also reported to be interested in "polyethylene production in Japan," says firmly: "No such plans are being negotiated at this time."



Stocks Skidding—for Now

Last week, drug and chemical shares—which had soared high above most other industrial securities in price gains during the past few years—were being dumped more forcefully than those of other industries (chart).

Since the 1958-59 bull market reached its peak late last July, the Securities & Exchange Commission's price index for all common stocks on the "Big Board" was down about 6%; the index for industrial chemical stocks was off 7.8%; and the index for drug and medicinal stocks was down 15.2%.

What caused the selloff, and what does it mean to CPI management?

Buyers Bored: Swarms of theories have been offered to explain what's happening, but most contend: the market was oversold on common stocks; the public had been buying stocks for income, appreciation, and as a hedge against inflation—and the buying tidal wave forced stock prices so high that yields were no longer attractive.

At the same time, investors were becoming bored with "special growth situations"—too many stocks were getting glowing recommendations. The public came to feel that runaway inflation is not an immediate threat, and noticed that bond yields have been rising. Another aspect of current market psychology: a relatively "tight money" period is with us, temporarily at least. Economic growth is expected to be more gradual, and investors are becoming increasingly cautious.

Dragged Along: Even though their business has been booming, nearly all of the leading chemical and pharmaceutical companies were dragged down by the bear market of the past few months. Price of Du Pont common, for example, was down 14% last week from its '59 high; a possible factor here, however, is that some investors are being especially wary. The latter may well fear that the Supreme Court may accept the Justice Dept.'s argument in the General Motors antitrust suit appeal and order Du Pont to sell its lucrative holding of GM stock.

Several chemical stocks—notably Atlas Powder, Dow Chemical, and Union Carbide—were off only a few points from their '59 high-water marks. But stocks of principal sulfur producers were off 30-40%, and leading fertilizer-chemicals producers' stocks were down 15-20%. Thiokol Chemical—even though it snared a rocket engine contract that makes record sales and earnings virtually certain for this year—saw its stock price subside to a point 28% below last year's high.

Pharmaceutical stock prices were undoubtedly affected by a Senate subcommittee's continuing criticisms of high drug profits, and the accompanying warning that new and restrictive legislation may be in the offing (*see p. 17*). Stocks of various leading companies—including Merck, which won a "not guilty" verdict in the recent polio vaccine lawsuit, but which later was criticized in the Kefauver committee's hearing on antiarthritic hormones—were down 20-30% from their '59 peaks.

Chemical Dividends Up: Chemical management has tried to be good to its stockholders. During '59, the U.S. Dept. of Commerce reported last week, producers of chemicals and allied products increased cash dividends to stockholders 10.3% (to $997.3 billion), while the increase for all industries' dividends was only 5%. Dividend increases by other process industries were significantly less liberal. Producers of nonferrous metals raised their cash dividends 6.5% last year, to $205 million.

And various chemical and pharmaceutical companies have favored their stockholders with stock splits—e.g., Allied Chemical's recent two-for-one split—and several other drug and chemical companies will likely propose such action this year.

More Apathy: CPI companies planning new financing this year will have to allow for the current lack of enthusiasm for common stocks. It now appears likely that this apathy may continue for some weeks, and may also turn up again later in the year.

But this doesn't mean that equity financing is out for '60. Chemical and other stock prices are still well above their levels of the past few years, and odds are that a growing company will be able to issue new shares this year without unduly depressing the stock's market price.

But, several small chemical companies have successfully staged public stock offerings during the past month's downslide; and the fact that bond buyers have been showing preference for convertibles indicates that, although appetites for common stocks are a trifle jaded now, they'll be whetted by the rising sales and earnings firmly expected this year and in the rest of the '60s.

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COMPANIES

Witco Chemical Co. (New York) has acquired Tar Distilling Co. and Old Colony Tar Co. Both will now operate as wholly owned subsidiaries of Witco. Headquarters for Tar Distilling are in Cleveland; Old Colony has four plants in Massachusetts—at Worcester, New Bedford, Cambridge and Framingham.

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Lion Oil Co. division of Monsanto Chemical will move its administration offices from Eldorado, Ark., to St. Louis in mid-'61. Two weeks ago, the company reported it would move its Plastics Division personnel to St. Louis from Springfield, Mass. Both are in line with plans to centralize all division headquarters.

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The Richardson Co. (Melrose Park, Ill.), manufacturer of industrial rubber and plastic products, has acquired Treplow Products, Inc. (Patterson, N.J.). Treplow makes organic chemicals and synthetic resins. This was Richardson's second acquisition within 30 days; it acquired a majority interest in The Plastics Corp. of America in late December.

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General Aniline & Film Corp. (New York) has moved home offices to the new Time & Life Building, 11 West 50th St., from its former Park Avenue address.

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Houghton Laboratories (Olean, N.Y.), manufacturer of epoxy adhesives and electrical insulation products, has changed its name to Hysol Corp.

EXPANSION

Gypsum: Kaiser Gypsum Co. (Oakland, Calif.) has taken property options to build two plants: at Houston, Tex., a 250-acre site owned by Heyden Newport Chemical Corp. on the south side of the Houston Ship Channel; and at Jacksonville, Fla., 34 acres owned by the North Shore Corp. on the east side of Dames Point, served by the Seaboard Air Line Railway. Primary engineering for the plants reportedly is under way, but capacities were not disclosed.

•

Uranium Ore: Susquehanna-Western, Inc. (Denver) will construct a $2-2.5-million uranium ore processing plant near Falls City, Tex., the 26th such plant in the U.S. and the first in Texas. Since August the company has been evaluating south Texas uranium resources. Construction of the unit will take about 10 months. The plant will process about 200 to 250 tons ore/day for sale to the Atomic Energy Commission.

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Sulfur: Texas Gulf Sulphur Co. (Houston, Tex.) plans a $1-million plant for filtration of dark sulfur. Location: TGS's Spindletop mine near Beaumont, Tex. Contract for the plant has been awarded to Consolidated Western Steel, division of U.S. Steel. Construction will begin in March, is slated for summer '60 completion.

•

Glass: Corning Glass Works (Corning, N.Y.) will double the size of its Muskogee, Okla., plant.

FOREIGN

Tires/India: Two tire manufacturing plants for India are in the planning stage: Goodyear Tire & Rubber Co. (Akron, O.) projects a $112-million tire and tube manufacturing facility near New Delhi, its third such plant outside the U.S. planned in a year's time; Dayton Rubber—also of Akron—and Bombay-based Premier Tyres Ltd. will build a $5.4-million tire and tube manufacturing plant in Kerala.

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Fibers/Italy: Montecatini (Milan) is planning to bring to the U.S. polypropylene fiber and fiber-grade resin in sample quantities. The fiber is produced at the company's Terni plant under the tradename Meraklon.

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Aromatic Solvents/Italy: Shell Italiana will add a 100,000-metric tons/year plant to the refinery at Rho, near Milan, for the extraction and fractionation of aromatic solvents. Shell owns the refinery in partnership with Condor. Most of Italy's 100,000 metric tons of aromatic solvents consumed by industry in '59 were imported. The plant will go onstream by mid-'61.

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Synthetic Rubber/England: International Synthetic Rubber Co., a consortium of eight rubber companies, will increase capacity of its Hythe plant near Southampton from 70,000 to 90,000 long tons/year of butadiene-styrene-type rubber. Speedup of operations rather than additional capital outlays will account for the increase. ISR, the only general-purpose synthetic rubber maker in the U.K., is also building a plant to produce about 7,000 long tons/year of synthetic latex for automobile upholstery.

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Citric Acid/Mexico: Miles Chemical Co., division of Miles Laboratories (Elkhart, Ind.), has joined with Mexican investors to form a $1.5-million citric acid producing company, Quimica Mexama, S.A. (Mexico City). The plant, to be built immediately, will use Miles' citric acid process in fermenting cane sugar.

Plans for a citric acid plant at Vera Cruz by a group of sugar growers (*CW, July 25, '59, p. 35*), trade sources report this week, have been at least temporarily abandoned. Also planning a citric acid plant in Mexico: Industrias Quimicas de Mexico, an affiliate of Stauffer Chemical (*CW, Jan. 2, p. 17*).

STONE & WEBSTER BUILDS

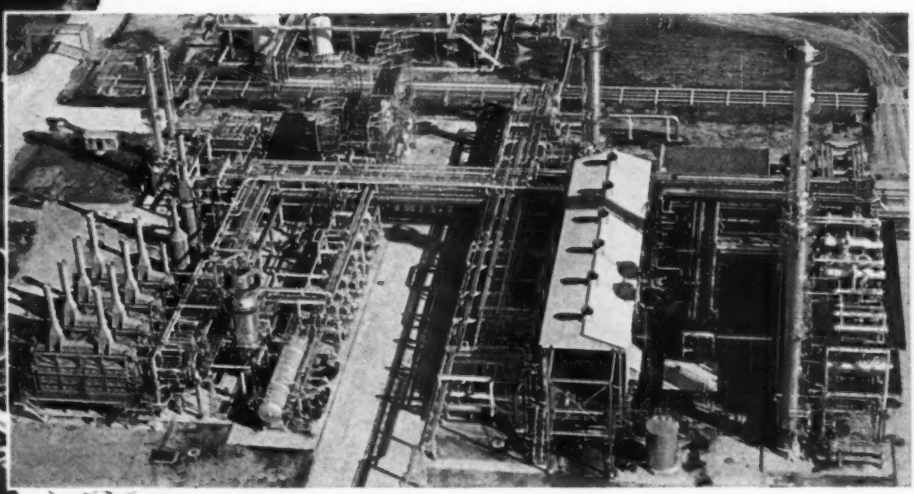
ANOTHER TEXAS BIG LEAGUER

Stone & Webster Engineering Corporation has recently completed the design and construction of a new ethylene plant at Port Neches, Texas, for the Jefferson Chemical Company. In recent years, Stone & Webster has built similar projects in Texas for Phillips Chemical Company and Gulf Oil Corporation.

The Port Neches plant, completed on schedule and well within the budget, more than triples Jefferson's ethylene and propylene production . . . and becomes the key installation in the expansion of their petrochemical production facilities.

In developing the plant design for high ethane and propane conversion rates, Stone & Webster engineers studied many processing schemes and feed stocks to achieve the flexibility required . . . a flexibility demonstrated by the fact that a high purity propylene can also be produced or the propylene recycled to make additional ethylene.

Let us demonstrate to you how Stone & Webster's skill and experience can assure a long-term, profitable operation for your next project. Please call or write our nearest office.



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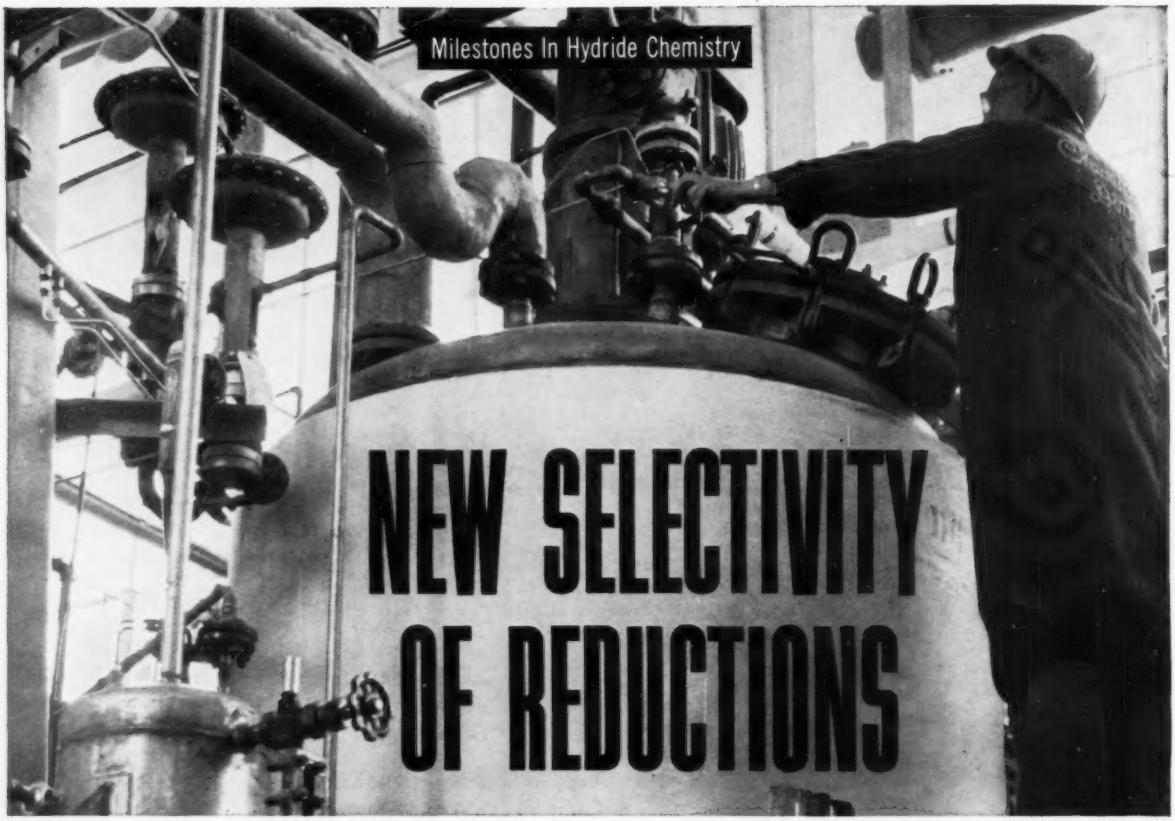

With MHI Lithium Aluminum Hydride

Development of new techniques for utilizing lithium aluminum hydride broaden the application of this powerful, ether soluble, reducing agent beyond aldehyde, ketone, ester and nitrile reductions. By combining other reagents with lithium aluminum hydride, mixed hydride systems are achieved that can be used to increase selectivity.

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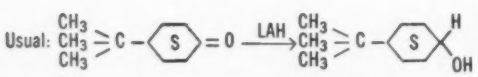
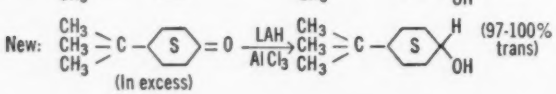
Usual: $RR'C(O)CHR'' \xrightarrow{LAH} RR'COHCH_2R''$ (Most substituted alcohol)

New: $RR'C(O)CHR'' \xrightarrow[AlCl_3]{LAH} RR'CHCHOHR''$ (Least substituted alcohol)

Usual:  (90% trans)

New:  (97-100% trans)

(In excess)

Usual: $RC_6H_4COC_6H_4R' \xrightarrow{LAH} RC_6H_4CHOHC_6H_4R'$

New: $RC_6H_4COC_6H_4R' \xrightarrow[AlCl_3]{LAH} RC_6H_4CH_2C_6H_4R'$

Usual: $o\text{-}NH_2C_6H_4COOH \xrightarrow{LAH} o\text{-}NH_2C_6H_4CH_2OH$

New: $o\text{-}NH_2C_6H_4COOH \xrightarrow[AlCl_3]{LAH} o\text{-}NH_2C_6H_4CH_3$

Usual: $C_6H_5OCH_2C_6H_5 \xrightarrow{LAH}$ no reaction

New: $C_6H_5OCH_2C_6H_5 \xrightarrow[CoCl_2]{LAH} C_6H_5OH + C_6H_5CH_3$ (Ether cleavage)

MHI lithium aluminum hydride is easy and safe to use. Reactions are rapid, yet easily controlled in conventional equipment. Reductions can be carried out at room temperature and atmospheric pressure. MHI Technical service is available to help you with your applications of lithium aluminum hydride.

For complete information;
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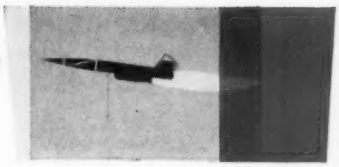

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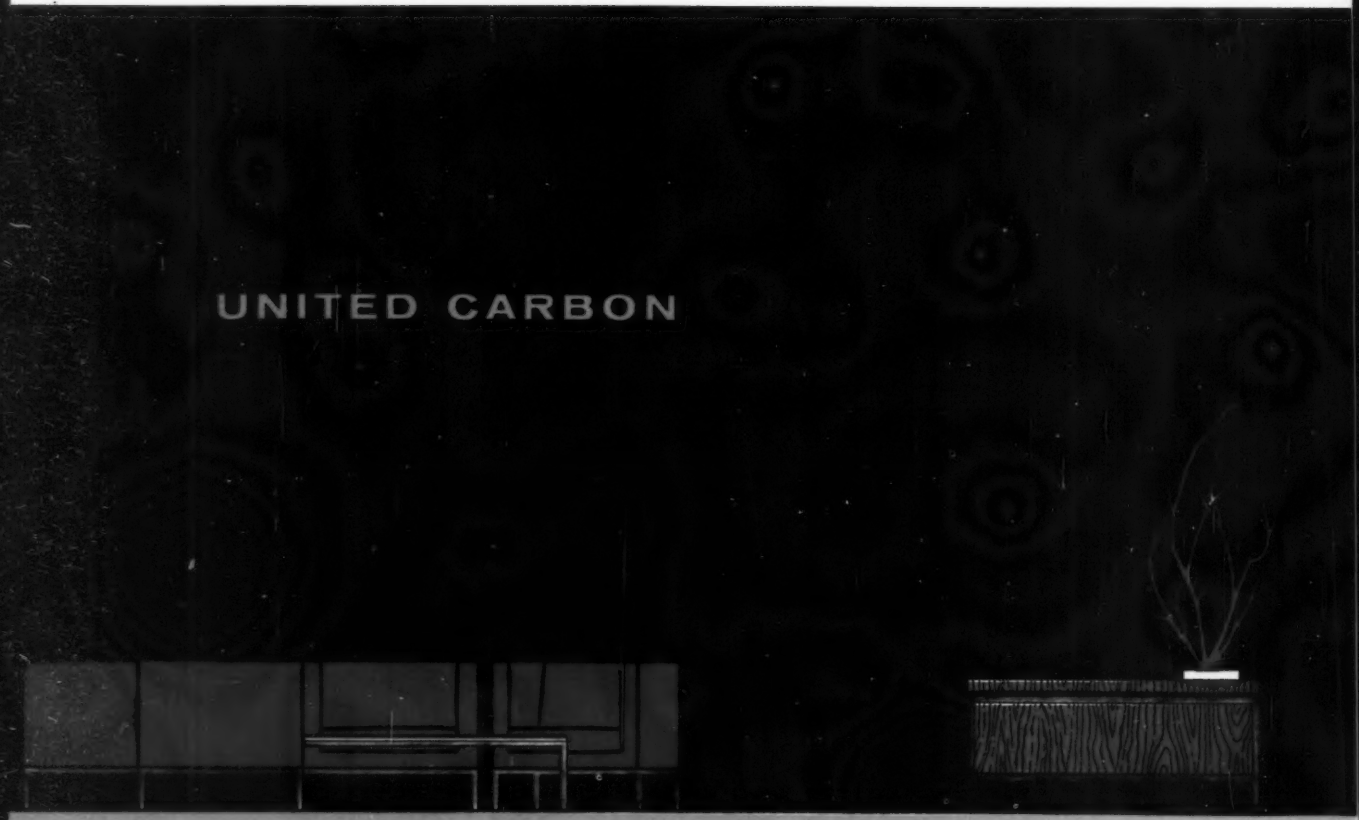

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SHELL

Washington
Newsletter

CHEMICAL WEEK
February 6, 1960

Tensions between Washington and Havana will tighten, despite President Eisenhower's restatement of a nonintervention, no-reprisal U.S. "Cuba policy." That is the prediction officials of both governments make privately.

Because chemical process industries share a large stake in $2 billion worth of U.S. trade and investment in Cuba, they will also be affected more than most.

Prime Minister Fidel Castro's Agrarian Reform Institute, as Washington sees it, actually has barely begun its revolutionary program. More expropriations and "interventions" will follow, including the ousting of U.S. sugar land holders and involving a scattering of other U.S. businesses as well.

By sticking to a policy of patience through all this, Eisenhower is buying time. Perhaps the most persuasive reason: to bring the Cuban crisis to a head by taking direct economic sanctions against Castro—such as cutting his export quota or dropping the 2¢/lb. price subsidy—could backfire. If effective, such a move could drive a deeper wedge between the U.S. and Cuba, push Castro farther to the left.

It also could bring about the collapse of Castro's government, creating a situation where an even unfriendlier leadership might take over.

U.S. economic pressures against Cuba cannot be ruled out indefinitely, however. The Administration will ask Congress for broader authority to administer the sugar quota and price when the control law comes up for extension this session. Eisenhower left the door open for U.S. retaliation. And even within the State Dept., policy-makers are not unanimously behind the patience policy backed by Secretary Herter and U.S. Ambassador to Cuba Philip Bonsal.

The Administration is gambling on one of two developments shaping up. The first is a hope that Castro may yet be persuaded to negotiate a compromise settlement with U.S. business interests in Cuba.

The other is the chance that Castro may fall from power. U.S. intelligence has no proof that this is approaching. Rather, Castro appears to be tightening, not loosening, his grip on the government.

For the U.S. CPI, there are some distinctly hopeful signs in an otherwise discouraging picture.

Cuba is trying to diversify its essentially one-crop sugar economy by stimulating domestic production of minerals, agricultural products and processed foods to reduce the island's dependence on imports and reverse a serious balance-of-payments deficit.

Most economists predict that the government cannot long sustain its present campaign to accomplish this without financial and foreign technical aid.

Cuba is likely to realize sooner or later that some accommodation with private U.S. investors is its best hope. The alternative is failure, which of course would cancel all bets, political as well as economic.

Indications of a somewhat easier attitude already have been evidenced by Castro toward a few U.S., as well as domestic, private businesses. The outstanding example is his arrangement concerning Freeport Sulphur Co.'s new $120-million nickel-cobalt-ammonium sulfate plant at Moa Bay (*CW, Jan. 30, p. 37*). Castro has allowed Moa Bay to ship two test loads of its semifinished product to a sister plant in Louisiana free of a prohibitive 25% mineral export tax put on the books last fall.

Negotiations are under way that may result in Freeport—and other private mines—agreeing to let the government market their production, substituting a 5% "commission" for the export tax. Castro also is negotiating a compromise with the U.S. government's nickel operation at Nicaro.

Castro hopes to push exports of other minerals, too, including chromite, manganese, copper concentrates, iron ore and others, which comprise Cuba's third-largest dollar-earner behind sugar and tobacco.

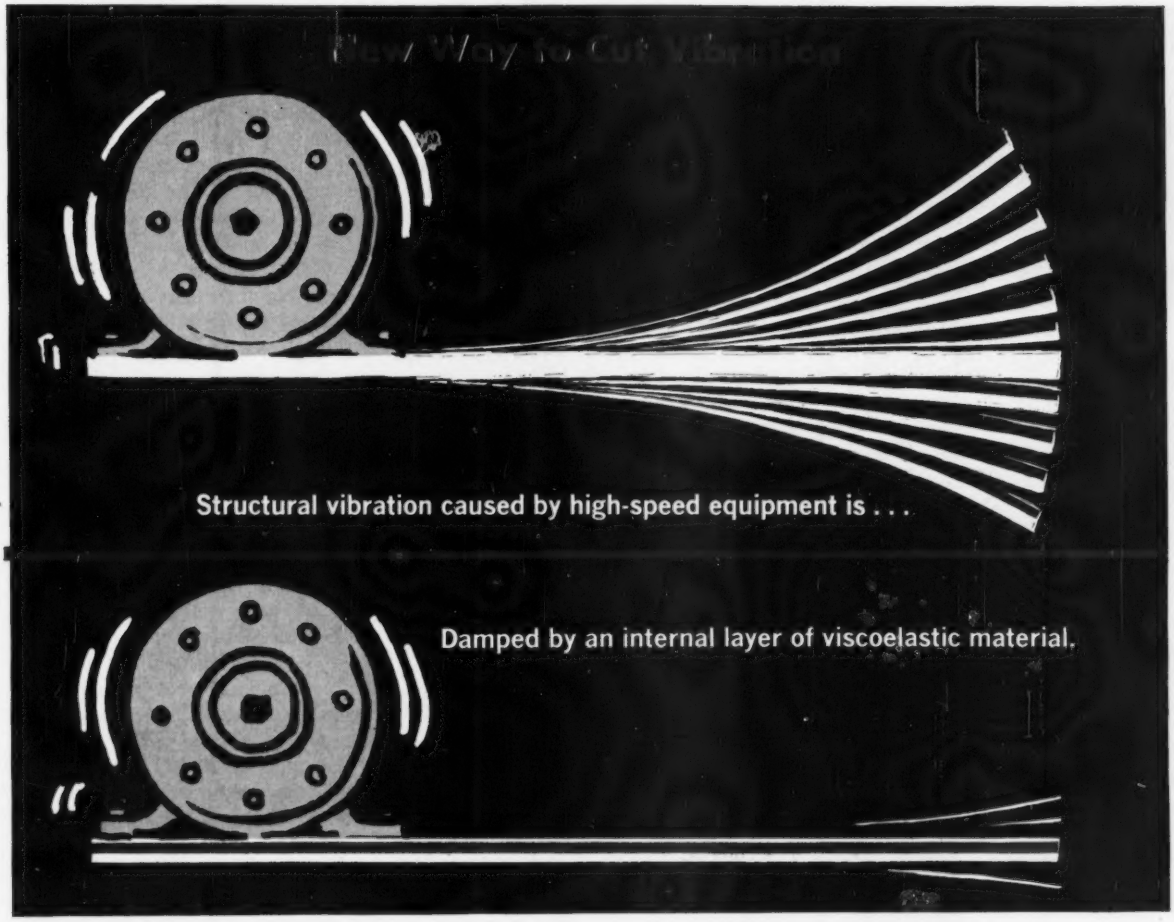
He also plans to develop other industries in which chemical processing is involved. The agrarian reform program may leave room for both importation and foreign investment in fertilizers and pesticides. Plans to establish food processing, canning, freezing, and packaging plants may provide another area for cooperation with nongovernmental interests.

Many problems still remain for U.S. traders and investors in Cuba. The Castro government has put an absolute ban on exchanging pesos for dollars and refuses to let U.S. subsidiaries repatriate profits in dollars or pay dollar debts owed U.S. suppliers.

•

The color additives bill appears to be headed for early passage. Hearings by the House Commerce Committee last week turned up little disagreement. Chairman Oren Harris (D., Ark.) is very emphatic about the need for the bill, which would allow FDA to set tolerances for colors that could be harmful only in large amounts. This would remedy present law, which bans any color unless it is completely harmless—knocking out lipstick colors no woman could eat enough of to be harmed.

But the industry is resigned to a Delaney (anticancer) amendment similar to the one applying to food additives; they know they can't get a bill without it. Their acceptance will speed passage through Congress. The bill could become law within a few weeks.



Taking the Shake Out of Process Plants

This week at the Air Conditioning Show, in Houston, chemical plant management can get its first look at a new spray-coating material made by the Korfund Co. (Long Island City, N. Y.) for controlling structural vibration. Called Vibrodamp, it is one of a host of so-called "viscoelastic" materials that have just become available to help solve complex vibration problems, which have mounted with greater use of high-speed equipment.

The viscoelastics damp vibration in the structure rather than try to isolate it by the long-standing technique of mounting the vibrating equipment on springs and pads. This extends the range of vibration frequencies that can be controlled, adds to structural life by cutting material fatigue.

And, while Korfund is using the viscoelastics strictly as coatings, Barry Controls (Watertown, Mass.) and Lord Mfg. Co. (Erie, Pa.) are using them in combination with metals for the design and construction of structural shapes. Barry has been using the design techniques quietly for the last 18 months to help solve a few special vibration problems, is now completing a shop for production-scale fabrications.

Lord, which like Barry has applied for patents on its design techniques, has had test pieces out in the field for over a year.

Aircraft and Missiles: Korfund's executive vice-president, Donald Vance, readily admits that the coating technique will probably be only about 50% as effective as the Barry and Lord structural fabricating techniques. But Korfund is shooting directly for industrial business, while Barry and Lord have jet aircraft and missile markets as prime targets.

Korfund's coating can be purchased for $15/gal. ($270 for 55-gal. drums), applied with a spray gun or trowel. One gallon will cover 60 sq. ft. to a $\frac{3}{32}$-in. thickness; the material has its maximum effectiveness at a thickness one and one-half times greater than the metal it is covering. It cures in 48 hours at room temperature (30 minutes at 350 F for a $\frac{1}{8}$-in. coating), forms a smooth surface that can be painted.

Barry and Lord design their structural shapes to fit requirements. One of the most usual shapes is laminated panelling (i.e., the viscoelastic mate-

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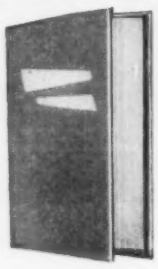

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rial is sandwiched between sheets of metal). In the construction of shapes such as I beams and channels, Barry inserts cells (bars or rods of metal) into the interior of the structure, surrounds the cell with the viscoelastic. Barry's president, Ervin Pietz, agrees that steel probably couldn't be fabricated into some of the shapes in which aluminum is now being used. But both Barry and Lord offer strips containing the viscoelastic that can be bolted or riveted to structures already in use.

Minnesota Mining and Manufacturing Co. (St. Paul, Minn.) has been offering an aluminum foil tape with a viscoelastic adhesive backing for aircraft use for about two years, is now trying to develop industrial markets. The company won't discuss price, but its product will probably have to be competitive with lead-vinyl film material now being touted as an acoustical-vibration control at a cost of $1-3/sq.ft. Materials of this type have been used for a number of years as X-ray shields, supplied by firms such as Cordo Chemical (Norwalk, Conn.) and Bar-Ray Products (Brooklyn, N. Y.).

Damping Effect: The viscoelastic materials dampen vibrations by converting them into shearing forces that are dissipated within the viscoelastic. The companies won't say which absorbers they are using. Korfund's Vance will say only that its material is a "mixture of high polymers and filler." There are a number of elastomer materials, such as the isocyanates, that might be used, although their high-temperature applications might be limited. Barry and Lord say their materials can be used at temperatures up to about 300 F.

Lord's operations manager, Richard Henshaw, says the material is bonded in the "best way possible" to the metals. Barry's staff engineer, Jerome Ruzicka, won't talk about bonding, says only that the viscoelastic forms its own bond with the metal. (Silicone-containing materials exhibit this bonding effect to some extent.)

Ruzicka says that strong bonding isn't necessary, cites his firm's early experiments using oil films to obtain the viscoelastic effect.

A Matter of Cost: While the techniques of Barry and Lord may be widely used in airborne and electronic equipment, cost is certain to hold back their use in chemical plants, where spring-mounted vibration isolators may cost as little as $50 for a small piece of equipment.

But springs are best when they are used to isolate low-frequency vibrations. Problems arise when machine vibrations get into resonance with the springs, and thus increase vibration problems. Pads of rubber, cork, felt, cotton belting, and lead and asbestos can be used for higher frequencies. The lead-asbestos pads are more expensive, but the others lose their effectiveness on aging—a property that is difficult to detect. And they are difficult to replace.

Usual procedure is to try to design the original plant structure for a natural vibration frequency above that of the equipment. Equipment suppliers try to balance their equipment, keep unbalanced forces low. But this isn't always possible (e.g., in crushing and grinding equipment). Moreover, there are many unknown factors in construction. For example, it is possible to determine the stiffness of steel, but it is impossible to predict what effects the fastening of the steel into place will have. It is possible to be off by as much as 200% from original calculations. Also, once a plant has been in service, equipment additions can result in problems that were unforeseen in original design.

It is sometimes possible to stiffen the structure to increase the natural vibration frequency and cut the chances of resonant vibration. But pad and spring isolators are often the simplest means of cutting vibration.

However, Barry engineers point out: "In all these methods, you have to worry about resonance. With viscoelastic damping, we don't worry about resonance; we let it fall where it may." Barry's tests show that even at natural vibration frequency of the structure, vibration can be cut beyond the problem point.

And where stiffness is an important point in usual construction methods for preventing vibration, Barry and Lord can use less rigid construction. This will also cut the weight of structural members—a value of a spray-on coating.

No Bones: While Korfund's material isn't as effective, it can eliminate the need for special stiffeners, at lower cost. It is more effective

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undercoating materials, should find acceptance for use on than present curtain walls and on the gear boxes of motors, in air ducts and fans.

Barry and Lord may find use for their lightweight panels in instrument mounting. Now chemical plants often mount instrument panels on pads, sometimes mount individual instruments in the panel on separate pads.

Whatever the ultimate uses to which the viscoelastic dampers are put, it's a good bet that they will be closely studied when vibration problems can't be solved by techniques now in wide use.

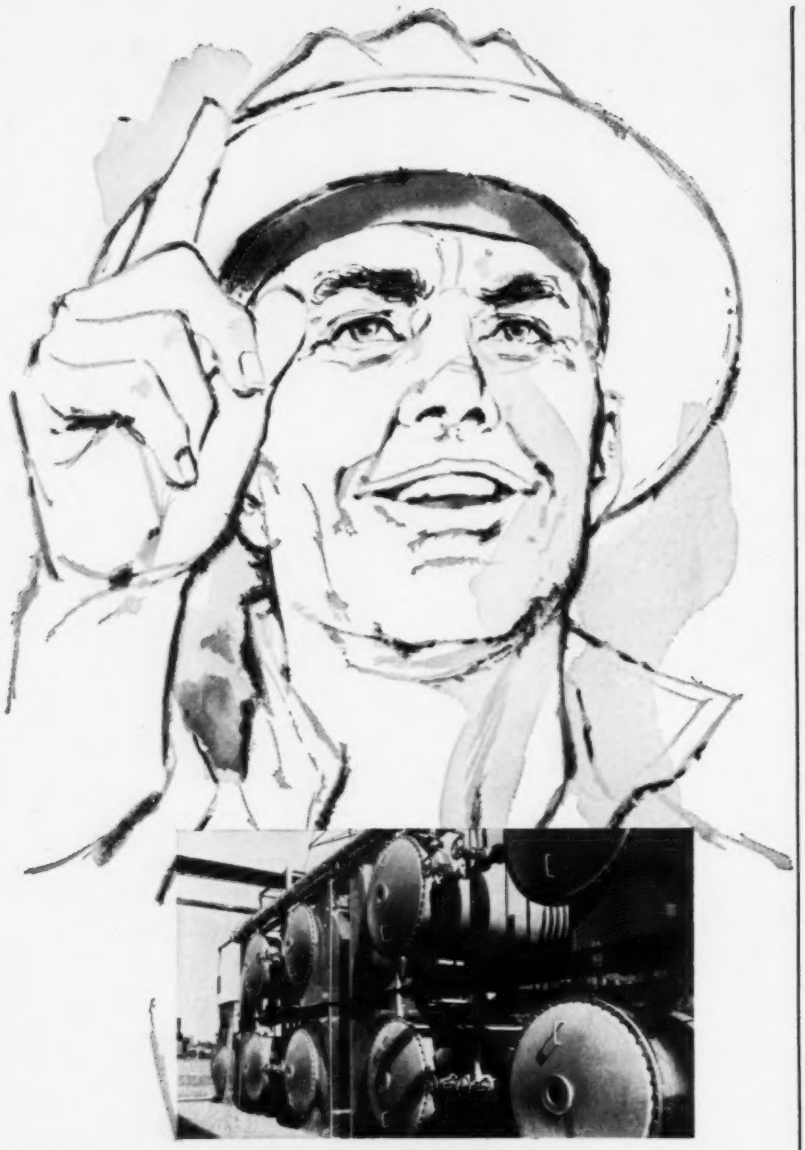
New Use for Neoprene

Under way this week in the Oklahoma panhandle is a 40-mile purge by Colorado Interstate Gas Co. (Colorado Springs) of its gas line in the Mocani-Laverne fields. It involves the new use of neoprene spheres for removing (pigging) pockets of condensed gasoline that accumulates in the many sags of ground-hugging pipeline.

Neoprene spheres themselves aren't new. For example, Shell has been using them for about a year in its north line between its Wood River and East Chicago, Ill., refineries. But Shell's use is for product separation rather than for pipeline cleaning. And its technique is the outgrowth of earlier use of rubber-edged dumbbells. Shell developed the inflated neoprene spheres with the help of F. H. Mahoney Co. (Houston, Tex.), also worked out a bypass system that maintains fluid separation through a pump station. The balls are 75% more efficient than the dumbbells in separating liquids.

Problem: CIG's problem is that heavy hydrocarbons, cooling to ground temperatures as they move through the line, condense to form liquid seals in the line sags, thus inhibit gas flow. The resultant backup pressures exceed the line maximums, cause failure of wellhead rupture discs. Ordinarily, the problem could be solved by installing drips at the sag points, but this was precluded by the great number of sags.

Solution: CIG is putting the neoprene spheres into the line through high-pressure valves modified to CIG's specifications by Rockwell Manufacturing Co. These balls push the liquid



Emery's new facility to increase pelargonic, azelaic acid supply

Emery's recently announced plant expansion for ozone-oxidation will increase several-fold total production of pelargonic and azelaic acids.

Volume demand has increased for these materials in such important products as synthetic jet-lubricants and high-quality vinyl plasticizers as research programs have matured to commercial status. Also, extensive research in many other products, such as alkyd resins and other polyesters and polymers, indicates rising demand for years to come.

This 6-million dollar expansion investment lends impetus to such end-product application research. With increased production assured, we suggest you prepare to exploit the unique properties of these 9-carbon acids – monobasic pelargonic and dibasic azelaic. Write now to Dept. I-2 for samples and literature.

Emery

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to a point where the liquids and spheres can be separated from the gas.

The novel system is automatic to the extent that, at the juncture of different-size pipes, the arrival of a sphere of one size triggers the injection of another sphere of the correct diameter, without loss of liquid. (CIG has 16-, 18-, 20- and 24-in. lines.) This permits all the liquid to be collected at one point. During the first six weeks of cleaning, 675,000 gal. of condensate were recovered. Spheres last through 800-1,000 miles of cleaning.

CIG's Vice-President Neal B. Laubach calls the solution of its problem "a pioneer effort in purging gas-gathering lines." And it may well have further applications in CPI pipeline jobs.

EQUIPMENT

Pipe Tape: Minnesota Mining and Manufacturing Co. (St. Paul 6, Minn.) is making a new polyvinyl chloride pressure-sensitive pipe protection tape that can be applied at temperatures as low as —5 F. The firm says the highly adhesive and flexible Scotchrap resists acids, alkalis, salts, refined petroleum products, is unaffected by fungi and mould, is a good insulator and remains stable in water.

•

Hydrogen Gas Control: General Electric Co. (Schenectady, N.Y.) has a new hydrogen gas control system said to be safer, 15% less expensive to install and one-third the size of units now cooling medium-capacity steam turbine-generators. GE turbines to be completed later this year will be equipped with this system. Size reduction and increased safety are achieved by separation of the electrical and gas controls and positioning the units closer to the generator, which reduces the length of piping and the number of welds in gas lines.

•

Tower Packing: A new polypropylene Pall ring tower packing with pressure drop and mass-transfer efficiency comparable to metal rings is being offered by U. S. Stoneware Co. (Akron 9, O.). It weighs 4½ lbs./cu.ft., can be packed to a height of at least 25-ft./plate, will provide economies in tower support plates and construction.

Emery's ozone oxidation expansion creates job opportunities

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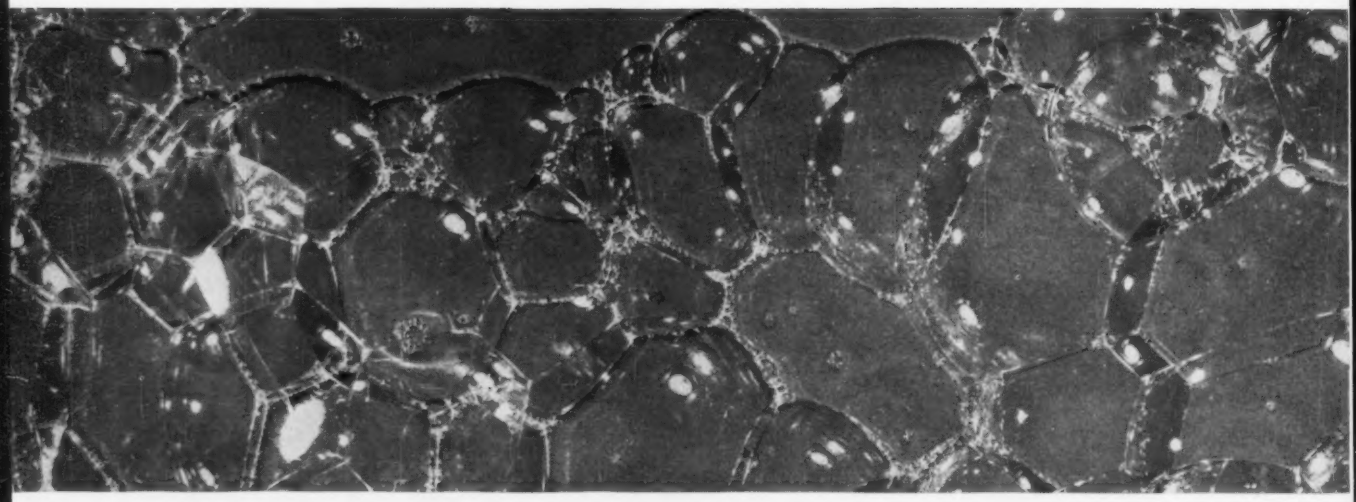


Products, Processes, Packages

Last week's annual convention of the Assn. of American Soap & Glycerine Producers Inc. brought more than 1,000 soapers to New York's twin-towered Waldorf-Astoria hotel. Theme of the meeting, "The Challenges of the Sixties," pointed up few sweeping changes ahead for soaps, but some notable trends in synthetic detergents that are significant to specialty chemicals makers.

Certainly one of the continuing big trends—especially in household products—is the growing popularity of liquid products. The liquid light-duties have gained continually since their introduction—the big spark being General Aniline's marketing of Glim, now owned by B. T. Babbitt. Right now, there are few light-duty powders left on the market.

What is of more recent significance is the growth of heavy-duty liquids. This growth seems due for a further speedup with the introduction of larger reservoirs for washing compounds in automatic washing machines. The housewife hasn't taken to machine dispensers that call for once-each-wash loading, so the new move, the soapers were told, is to provide reservoirs that can hold a week's supply of compounds. But there's little for makers of granular materials to rejoice about in this trend—the machines are all designed for liquid products.

An interesting countertrend is the recent introduction by Procter & Gamble of a heavy-duty, low-sudsing 2-oz. detergent tablet. Called Salvo, the product is packed in cartons of 12, 24 or 72. It's being test-marketed in San Diego, Calif.

Use of the liquids has caused some displacement in the phosphate field. Where the builders (aid to cleaning agents) in powdered products are the sodium phosphate type, there's now increasing use of potassium phosphate in liquids. These materials are considerably more expensive, but their higher solubility has boosted their use.

Also accelerating the trend toward liquids—both light and heavy duty—has been the discovery by small regional soap-sellers that they do not need big capital investments in equipment to compete in the liquid field. To compete in the dry products market, on the other hand, it's essential to carry spray-dried products—and cost of a spray tower is around $750,000.

Challenging Privateers: But it isn't lower capital investment alone that has helped the smaller syndet seller—brands of liquids are not so securely established, and it is much easier for a private labeler to compete.

With local sellers offering housewives lower-cost products, it's necessary for the big companies to offer something new if they want to offset the difference in price. This factor provides a rich opportunity for additives makers to sell more of their products to the big soapers.

Go Basic? Although going into manufacture of basic raw materials has helped companies meet competition in some fields—notably plastics—there's little likelihood of this happening in the detergents field. If nothing else, the present low profits on phosphates discourage many from making the huge investments required there. And in surface-active agents, recent skirmishes among suppliers—the "price war" on alkyl aryl sulfonates and on other materials—also have resulted in soapmakers' being able to buy most basic materials at prices that make captive manufacture of these products unattractive.

Although some soapers, notably Procter & Gamble, have taken up raw-material manufacture in the past, many in the industry think this kind of "integrating backwards" will not characterize future activity in the industry.

Future chemical-making by soapers will probably be along the lines of Lever's latest venture at Baltimore; there it plans to turn out amine condensates, e.g., lauryl diolamine and lauryl isopropanolamide.

One significant raw-material development: the much-talked-about Conoco process for producing synthetic

IN SOAP AND DETERGENTS, WATCH FOR . . .

- **Continued movement toward liquid household products.**
- **More private-label brands—especially liquids—in local markets.**
- **Continued interest in products from Ziegler and oxo processes.**
- **Increased application of continuous sulfonation techniques.**
- **Leveling off of surfactants prices, less price-cutting.**
- **Increased use of potassium phosphate builders.**
- **Gradually rising cost of builders in general.**

Pace Changing Syndet Scene

fatty alcohols (*see also Markets, p. 41*). These materials, similar to lauryl alcohols, might make some dent in the detergents market.

Although the long-chain fatty alcohols produced by the Conoco Alfol process are thought by many soapers to be superior to dodecyl benzene sulfonates, the Conoco products will have to meet some stiff price competition to gain a foothold in the detergent field. Some industry spokesmen believe Conoco must tag its products as low as 15¢/lb. to make them attractive to detergent makers.

Also getting attention as detergent building blocks are the higher alcohols obtained by the oxo processes, although, for the moment at least, they're getting less attention than the Conoco process products.

This is largely because of the branched-chain configuration of these products. About the only oxo material now being pushed in the detergent field is tridecyl alcohol—but its price (around 25¢/lb.) restricts it to highly specialized items.

What About Bars? Although there was considerable interest in synthetic detergent bars when they came out a few years ago, developments are sparse. Latest is the market entry of Colgate's Spree.

Despite efforts to use the inexpensive alkyl aryl sulfonates for bars (harshness is the problem), the general trend is toward use of reaction products of fatty acids and methyl taurine (e.g., Igepons) plus soap. All the major synthetic bars appear to have this basic formula idea except P&G's Zest, reportedly made of alcohol sulfates and monoglycerides.

Accurate figures on how the synthetic bars are doing in relation to "straight" soaps aren't available, but one trade observer estimates that by '70 at least 50% of the bars will be synthetic—and this meets only mild dispute from toilet bar manufacturers.

Packaging: The use of plastics in detergent packaging is expected to grow rapidly in the near future. The recent introduction of light-duty liquids in blow-molded containers by Armour, Purex, Lever Brothers and P&G is one step in this direction.

Another trend in packaging may be the increased use of soluble films. These films would be used for one-shot packets of granular products. One product, Toss, is already on the market and others are expected to enter test markets soon.

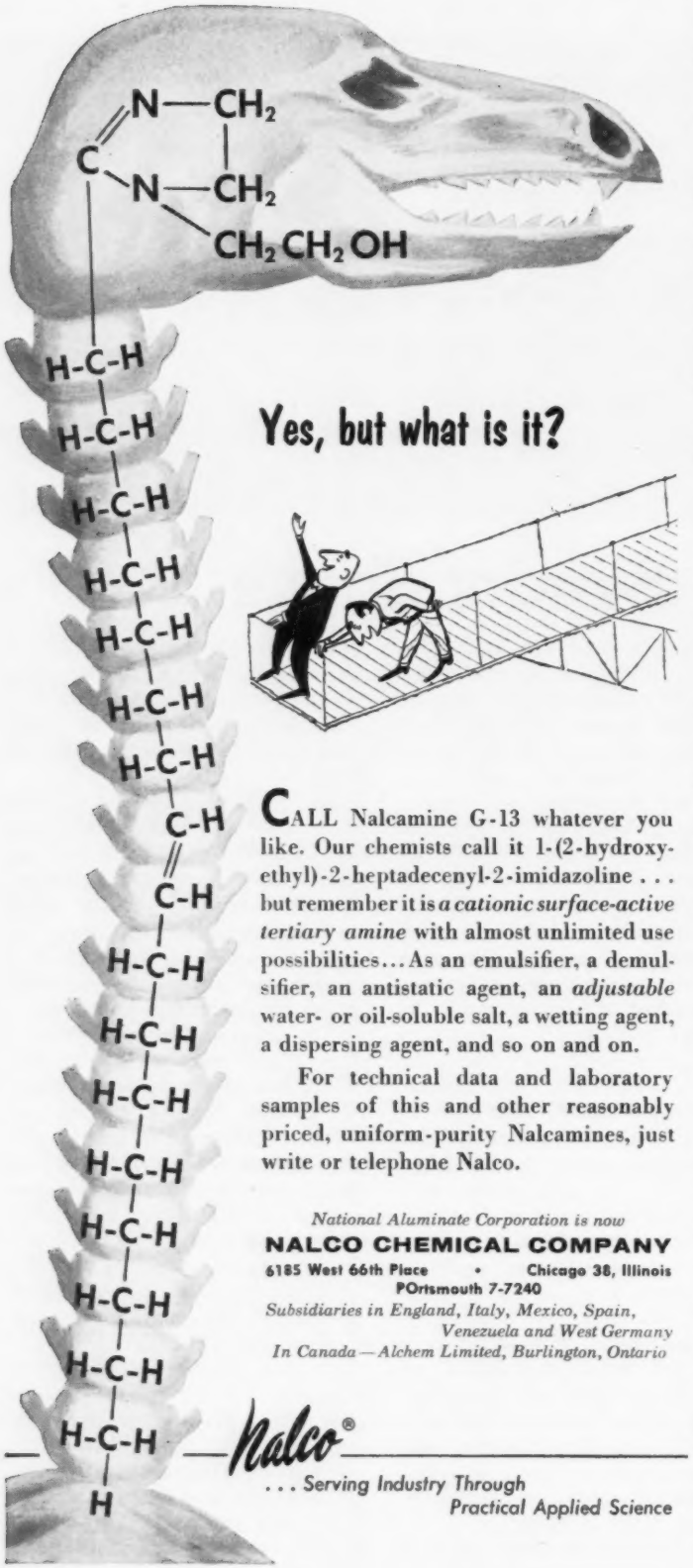
The only materials available for this kind of packaging have been methylcellulose and polyvinyl alcohol, but starch film may enter this competition, along with a new film being turned out in pilot-plant quantities by Union Carbide.

The latter, called Polyox film, is based on polyethylene oxide. It is a thermoplastic material that can be extruded and calendered. Made from plentiful ethylene oxide, these films are expected to be offered at a price lower than that of soluble films now marketed.

Size of Market: Although estimates state that total sales of synthetics will climb about 25% in the next five years—a figure not out of line with the present rate of growth—it's highly probable that the sales curve will begin to flatten out after that. Most growth now stems from population gains, not higher per-capita use.

The population increase will continue to push sales upward; but within the next five years, per-capita use will tend to decrease with the perfection of disposable clothing, linens, diapers and towels. And light-duty syndets could suffer if ultrasonic washers can be brought within the price range of the average householder. These machines, as now manufactured, use little detergent, compared with conventional dishwashers.

Over-all, the changes in soap and detergents are likely to be less significant than the developments of the last few years. Nevertheless, the public's insatiable demands for new products will keep soapmakers busy turning out new items. They must, to survive in their highly competitive marketplace.



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PRODUCTS

Synthetic Rope: Plymouth Cordage Co. (Plymouth, Mass.) is manufacturing a synthetic fiber rope using Prolene, a multifilament type of polypropylene made by Industrial Rayon Corp. (Cleveland). It's said to have greater ease of handling, higher strength and better durability than monofilament rope.

•

Polymeric Adhesive: Monsanto Chemical Co.'s Plastics Division (Springfield, Mass.) is marketing a water-soluble polymeric adhesive, PM-22, developed to prevent slipping of palletized polyethylene industrial shipping bags. The material is said to resist horizontal shear and permit easy vertical separation of the stacked bags. Based on a carboxyl-containing polymer, it can be easily removed, does not damage printing or stenciling. Price: $57.50/100 lbs.

•

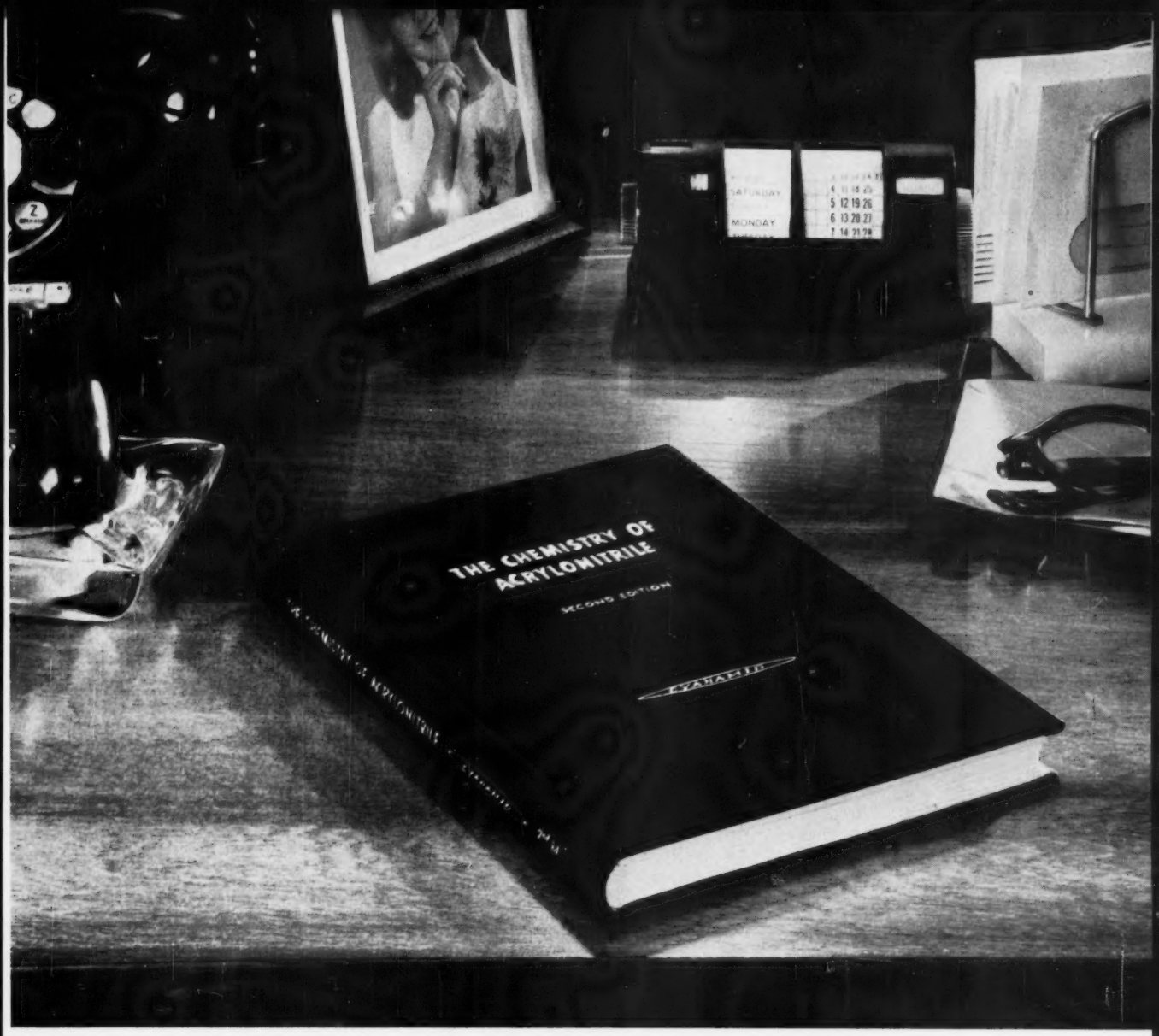
Pet Powder: Davison Chemical Division of W. R. Grace & Co. (Baltimore, Md.) has developed an insecticide for killing fleas on pets. Dri-Die Pet Powder attacks the outer coating of the insect and upsets its moisture balance. Simple contact with the powder is enough to kill the flea. Particles of the powder are coated with a monomolecular layer of ammonium fluosilicate, which, combined with the silica gel, is poisonous on contact. Pint cans will retail for $1.80.

•

Surfactant: Onyx Oil & Chemical Co. (Jersey City 2, N.J.) says its new Maprofix ES, a sodium lauryl ether sulfate, has good detergent, wetting, dispersing and foaming properties. Its advantage over sodium lauryl sulfate is said to be lower cloud point and higher tolerance to calcium and magnesium ions. The product is suggested for cosmetics, particularly shampoo formulations, and also as a suspending agent for pigments and latex emulsions. Standard package: a 55-gal. container.

•

Fuel Additives: The Tretolite Co. division of The Petrolite Corp. (369 Marshall Ave., St. Louis, Mo.) is now selling the Tolad line of fuel oil additives. One product is an inhibitor for domestic heating fuels; a second is an inhibitor-dispersant additive for diesel fuels.



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OXO-CHEMICALS CAPACITIES
Million pounds/year

Producer	Existing	New	Due Onstream
Amoco			
Wood River, Ill.	12	–	–
Esso			
Baton Rouge, La.	60	–	–
Baton Rouge, La.	–	60	'61-'65
Gulf Oil			
Port Arthur, Tex.	12	–	–
Philadelphia, Pa.	–	36	Jan. 1 '61
Texas Eastman			
Longview, Tex.	120	–	–
Union Carbide			
Texas City, Tex.	60	–	–
Texas City, Tex.	–	60	early '60
Totals	264	156	

Too Much Oxo Capacity?

U.S. oxo-chemicals capacity will jump at least 60% in the next few years—from the existing 264 million lbs./year to an estimated 420 million. Paradoxically, big - volume outlets aren't materializing and, according to industry consensus, the current over-capacity is likely to get worse before it gets better. Nevertheless, manufacturers remain optimistic, while they build units that can meet the still-hoped-for demands of the future.

Because of the highly competitive market situation, oxo producers are highly secretive about their own plant capacities, but readily speculate about oxo capacities of others. Best available consensus of these capacities is shown in the table (*above*).

The actual capacity of any plant may, of course, vary considerably, depending on which products it makes; and if there is a switch in product line, capacity may change significantly.

Also, if "blocked out" operations are used (i.e., periodically switching from one product to another and, in effect, making the process a batch-type operation), a loss of time—hence loss of capacity—may occur during transition periods.

Big Buildup: Largest producer now is Texas Eastman, whose recently completed expansion at Longview, Tex., boosted the firm's oxo potential to an estimated 120 million lbs./year.

Union Carbide's capacity is thought to be 60 million lbs./year now, will probably be doubled to 120 million when expansion is completed in "early '60."

Esso is now the third-largest oxo-chemicals producer, with 60-million-lbs./year capacity, but will eventually move into the 120-million-lbs./year league (along with Carbide and Eastman) when its plant capacity-doubling is completed. But the firm isn't rushing the job, says it will put the new capacity into operation "gradually over several years," starting in '61.

Gulf Oil now has 12 million lbs./year of oxo capacity, but has a new plant going up at Philadelphia (due onstream Jan. 1, '61); this unit is of special interest because it will be the first oxo plant in the East—near major markets for the compounds. Gulf says the new plant will have "three times the capacity of the existing unit at Port Arthur, Tex.," which adds up to 36-million-lbs./year capacity.

A Gulf spokesman says his firm "has no present plans to shut down the old plant when the new one comes onstream," contrary to trade talk.

What about Amoco? The firm has about 12-million-lbs./year oxo capacity at Wood River, Ill., but trade observers have long been convinced that the firm is browsing around for a site suitable for a new unit—probably in the 60-million-lbs./year class. Amoco doesn't deny this, but says it has no definite construction plans.

Sideswipe by Continental? Meanwhile, Continental Oil is bidding for the "higher alcohols" market. The firm will make a broad range of straight-chain alcohols at its new 50-million-lbs./year plant now going up at Lake Charles, La. The products—to be turned out by a Ziegler-type, so-called Alfol process (not an oxo process)—are expected to make a particularly strong play for the detergents market (*CW, April 25, '59, p. 35*).

Continental has been talking about low selling prices, but trade observers doubt that the Alfol process economics will permit significant undercutting of oxo-chemical prices. It's admitted, however, that the company has a good chance of cracking the detergents market—even at modest premium prices—because of properties of its straight-chain alcohols. In any case, Continental's forthcoming alcohols output must be considered a significant competitive factor in the oxo-chemicals picture.

Others on the Sidelines? Trade observers figure several other companies are possible participants in the oxo business — among them Jefferson

CPH-4

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WHAT ARE OXO CHEMICALS?

Oxo chemicals are compounds—mostly C_4 and higher alcohols—made by the so-called "oxo" process. The oxo process is a method of converting—by reaction of carbon monoxide and hydrogen—olefin hydrocarbons into aldehydes, thence into alcohols.

Because ethylene was used in the earliest reactions studied, and both an aldehyde and ketone were formed, the reaction became known as the "oxo" reaction—through adaptation of the German word "oxierung," which means ketonization.

The trade now recognizes that the term "oxo" is inappropriate and misleading, and many oxo producers don't like the word. Although they propose alternates such as hydroformylation, carbonylation, formylation, the term "oxo" is so deeply entrenched that its elimination seems unlikely.

One of the arguments against use of the term to describe a line of products resulting from the oxo process: it's confusing because it obscures the fact that many oxo-type products are also made by other processes. For that reason, it should be remembered that consideration of products derived by the oxo process does not, in all cases, provide a complete market picture for this class of chemicals.

Chemical, Monsanto, Grace, Shell Oil. Although spokesmen for these companies admit oxo market possibilities have been explored, new plant construction plans were not revealed.

Jefferson says it has done "considerable market research on oxo chemicals and is seriously considering going into production of such compounds as butanol, isobutanol, and plasticizer alcohols—via the oxo process."

It's certain that, if the unit is built, it will go up in Texas near Jefferson's captive source of propylene. Considering the time required to build an oxo plant, it would be at least two years before the firm could enter the race.

Industry Schism: The U.S. oxo-chemicals industry is a Janus-like combination of chemical and petroleum firms. Since they view the oxo scene in differing perspectives, causing differing concepts about oxo marketing methods, friction results.

It's obvious that petroleum firms now in the oxo business are, for the most part, casting about for large-volume uses and make little noticeable effort to expand their lines of oxo products to fit smaller demands. This approach of course, considerably simplifies marketing problems.

On the other hand, basically chemical companies in the oxo business—Union Carbide and Texas Eastman—spread their marketing efforts over a much broader spectrum of oxo compounds and their derivatives, sell to many outlets, steadily expand captive uses. Naturally, this approach calls for greater financial outlays for research and product development.

Carbide, for example, makes seven basic oxo chemicals: propionaldehyde, butanol, isobutanol, butyraldehyde, isobutyraldehyde, primary amyl alcohol, isodecanol. From these are derived chemicals such as propionic acid, 2-ethylhexanol, 2-ethylhexoic acid, butyric acid, butyl acetate, isobutyric acid, n-valeric acid, isopentoic acid, primary amyl acetate, isodecanoic acid.

Likewise, Texas Eastman lists a variety of basic and derivative oxo products, including propionaldehyde, normal and isobutyraldehyde, normal butanol, 2-methyl- and 3-methyl butanols.

Producers' lists of petroleum-based oxo products are relatively short. Amoco, Esso and Gulf Oil all make iso-octyl alcohol, Amoco and Esso make decyl alcohol, and Esso makes

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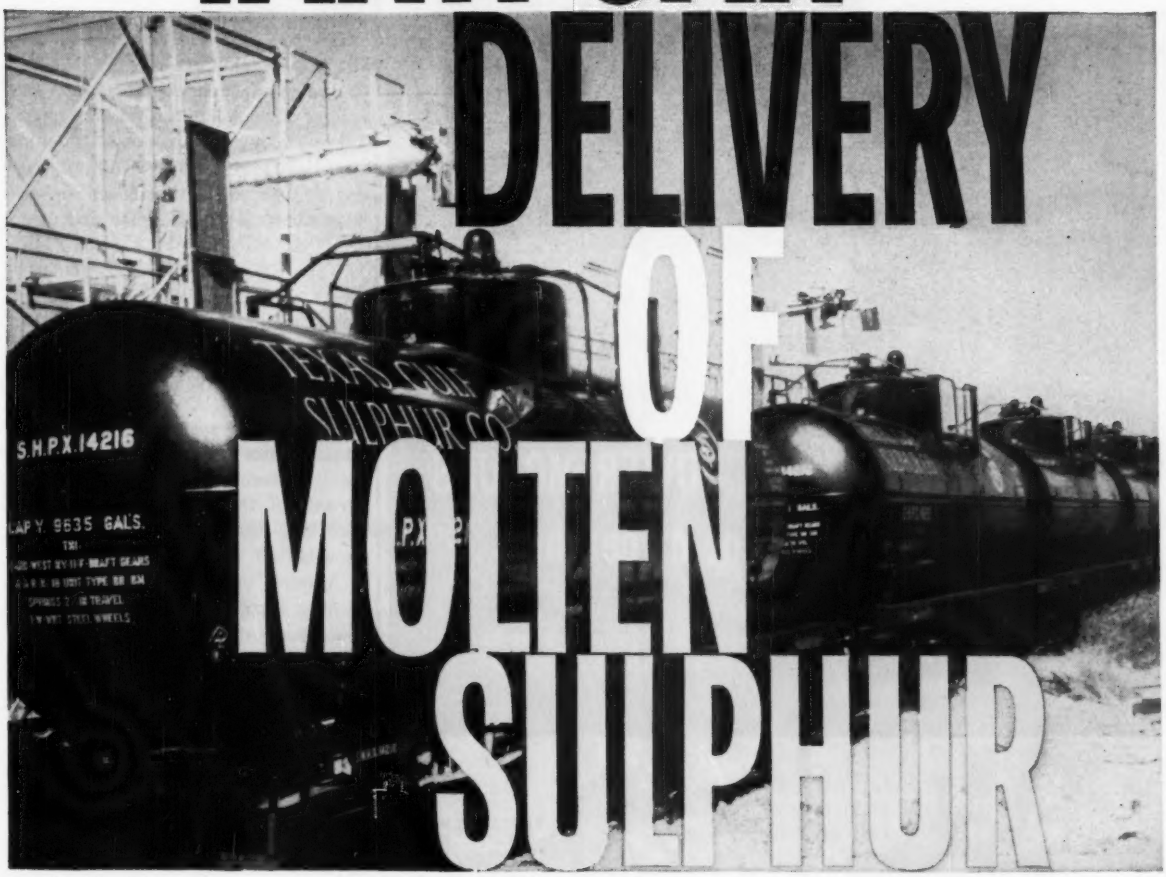

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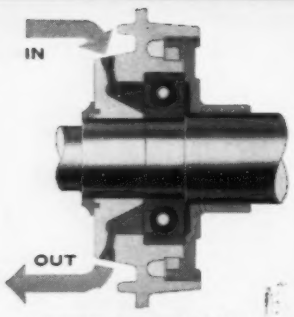

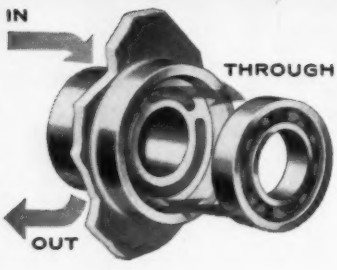

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W 9-4

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tridecyl alcohol. Although Gulf has only one product now (iso-octyl alcohol), a spokesman says initial output at the new Philadelphia plant will probably include decyl alcohol; other products ranging from hexyl through tridecyl alcohol can be made there if markets develop.

Sowers and Reapers: Some representatives of the chemical industry accuse the petroleum companies of stepping into this area of the CPI without making enough effort in research and development to broaden the industry's horizons.

Typically, a remark of Union Carbide's vice-president of marketing, John Field, may well have been, at least in part, about the oxo business: "Those who come expecting to sell their product to a single large customer because of price and without contributions of research and technical service do not contribute to the growth of the industry and may in the long run seriously hinder its growth."

Another point aimed at the newcomers: after sizable new markets are unearthed—through extensive market development—there's little to prevent others from jumping in to share in the harvest.

But representatives of oil companies have some rebuttals—and complaints of their own. Significant market development, it's argued, is being done, although the broad research-development programs conducted by chemical companies often aren't feasible, for two reasons: it's tough to catch up with technological know-how of the old-timers; some oxo plants aren't big enough to support extensive research programs.

Meanwhile, some petroleum company market researchers grumble about uncertainties injected into the oxo business by unpredictable maneuvering by Carbide and Eastman—possible partly because those firms can switch oxo product lines at ease, juggle output between the oxo process and other established methods.

Market Doldrum? None—basic chemical maker or oil producer—appears able—or willing—to spell out the magnitude of the current overcapacity problem.

Oxo-chemicals consumption is hard to pinpoint. Trade observers generally figure that about 80% of all iso-octyl and decyl alcohols go into vinyl

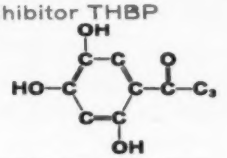
Eastman Briefs
FOR FEBRUARY

Eastman Inhibitors

A slight change in format this month to center attention on some rather uncommon chemicals which show promise as industrial inhibitors. If your needs run to antioxidants for protection of polyolefins and paraffins, look over Eastman Inhibitor THBP (B19). For ultraviolet stability, consider, if you will, the following three: Eastman Inhibitor RMB (B20) for cellulosics and polyesters; Eastman Inhibitor HPT (B21)—a clear liquid incidentally—for vinyls; and Eastman Inhibitor OPS (B22) for polyolefins.

One of these might possibly give your product the kind of protection it needs against the property-degrading activity of oxygen or ultraviolet light. We'll gladly furnish additional data and samples when you're ready.

Eastman Inhibitor THBP



Trihydroxybutyrophenone

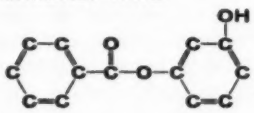
Form ..... *solid*
Melting point ..... *149-153°C.*
Solubility ..... *alcohol, oils*

Our development people point with pride to the potent antioxidant activity of this unusual phenone, particularly in polyolefins and paraffins

Eastman Chemical Products, Inc.
Kingsport, Tennessee

B19

Eastman Inhibitor RMB



Resorcinol Monobenzoate

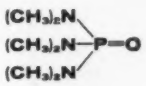
Form ..... *solid*
Melting point ..... *132-135°C.*
Solubility ..... *most organic solvents*

We're long on experience with this one in cellulose plastics and films. Good in certain polyesters, too.

Eastman Chemical Products, Inc.
Kingsport, Tennessee

B20

Eastman Inhibitor HPT



Hexamethylphosphoric Triamide

Form ..... *liquid*
Boiling range, 739.4 mm. ..... *230-232°C.*
Solubility ..... *polar and non-polar solvents*

We placed a test strip of HPT-stabilized poly (vinyl chloride) on the roof rack in 1952, and just before we went to press it was still in excellent condition. Must be formulated along with a heat stabilizer, however.

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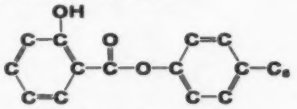
Kingsport, Tennessee

B21

Eastman Inhibitor OPS



p-Octylphenyl Salicylate

Form ..... *solid*
Melting point ..... *72-74°C.*
Solubility ..... *most organic solvents*

The well known u.v. stabilizing activity of salol is chained to an octyl group to increase compatibility —in polyolefins, for instance.

Eastman Chemical Products, Inc.
Kingsport, Tennessee

B22

Chemicals Division BW
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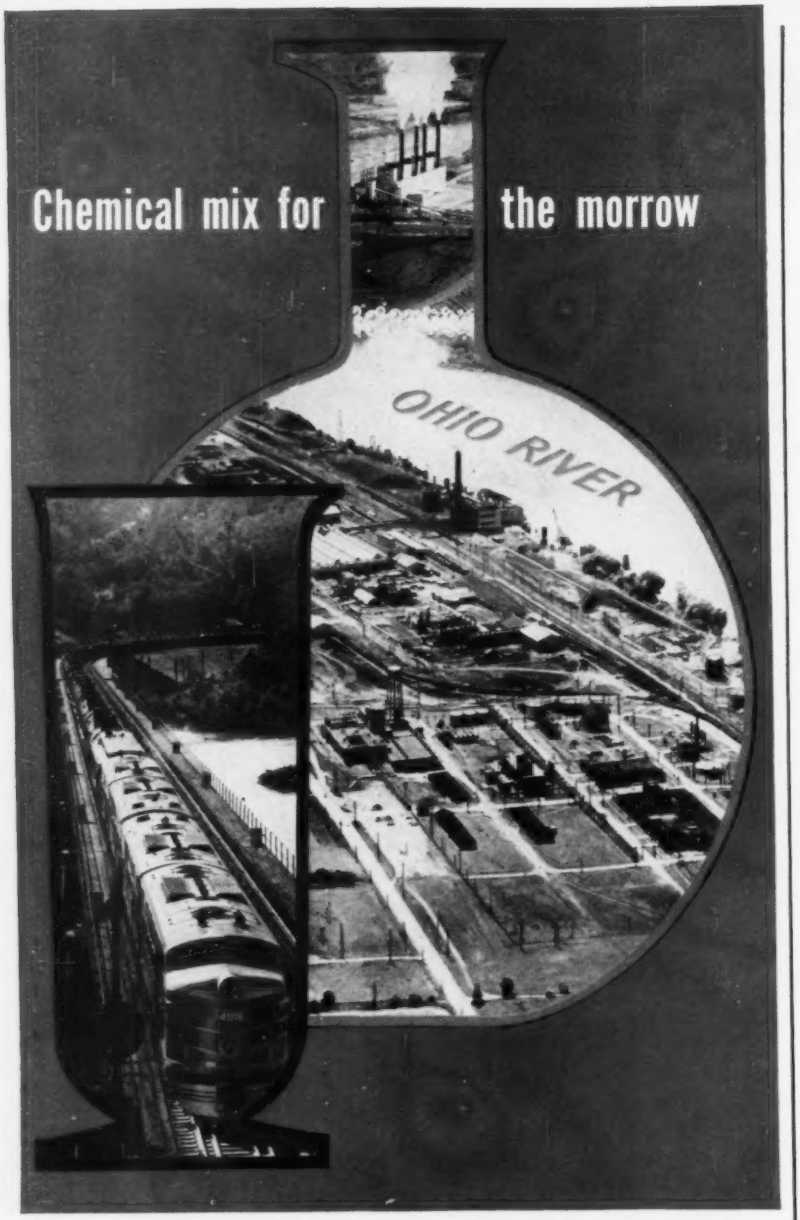

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plasticizers—and it's the expectation of continuing big gains in vinyl markets that, for the most part, keeps oxo producers reasonably optimistic.

Only a very small part of total oxo alcohol production now goes into detergents—which once was hopefully looked upon as the one big outlet for tridecyl alcohol. (Now that outlook is depressing, especially in light of Continental's possible market advantage.)

Some also estimate that about 5%—at most 10%—of oxo production is exported. The synthetic lubricants market probably takes about 7.5 million lbs./year of oxos—mainly 2-ethylhexanol and iso-octyl alcohol.

Why, then, the big expansion rush? It's hinted that part of the reason may lie in the hope of discouraging newcomers from the field, which is expected to grow eventually into a sizable business. And, of course, there's always the possibility—and certainly the producers' hope—that at least one new big-volume outlet might soon be discovered.

New Glycerine Records

In his annual report last week, the Glycerine Producers Assn.'s E. Scott Pattison said that U.S. production and consumption of glycerine reached new highs in '59. Production was estimated at 265 million lbs.; consumption was about 260 million lbs.

Heavy demands for glycerine pared stocks during the year. Low point was in late summer, when inventories dropped to 50 million lbs.—normally sufficient to supply two months of demand. Since then stocks have increased to about 54 million lbs.

Behind the new production is, of course, the increased consumption of glycerine in the U.S. But another contributing factor is the heavy demand for glycerine in Europe (*CW, Aug. 15, p. 75*), which reduced imports and resulted in a net export balance of over 8 million lbs.

Output of both natural and synthetic glycerine increased during '59—natural about 130 million lbs., synthetic slightly higher.

Thus, for glycerine makers, '59 was the best year on record; but for the chemical industry, this market represents a growth area that will doubtless mean additional expansion of synthetic capacity during the next two to five years.

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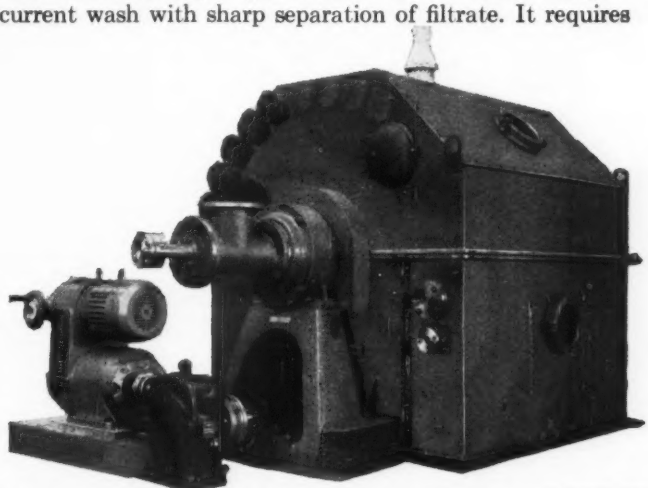

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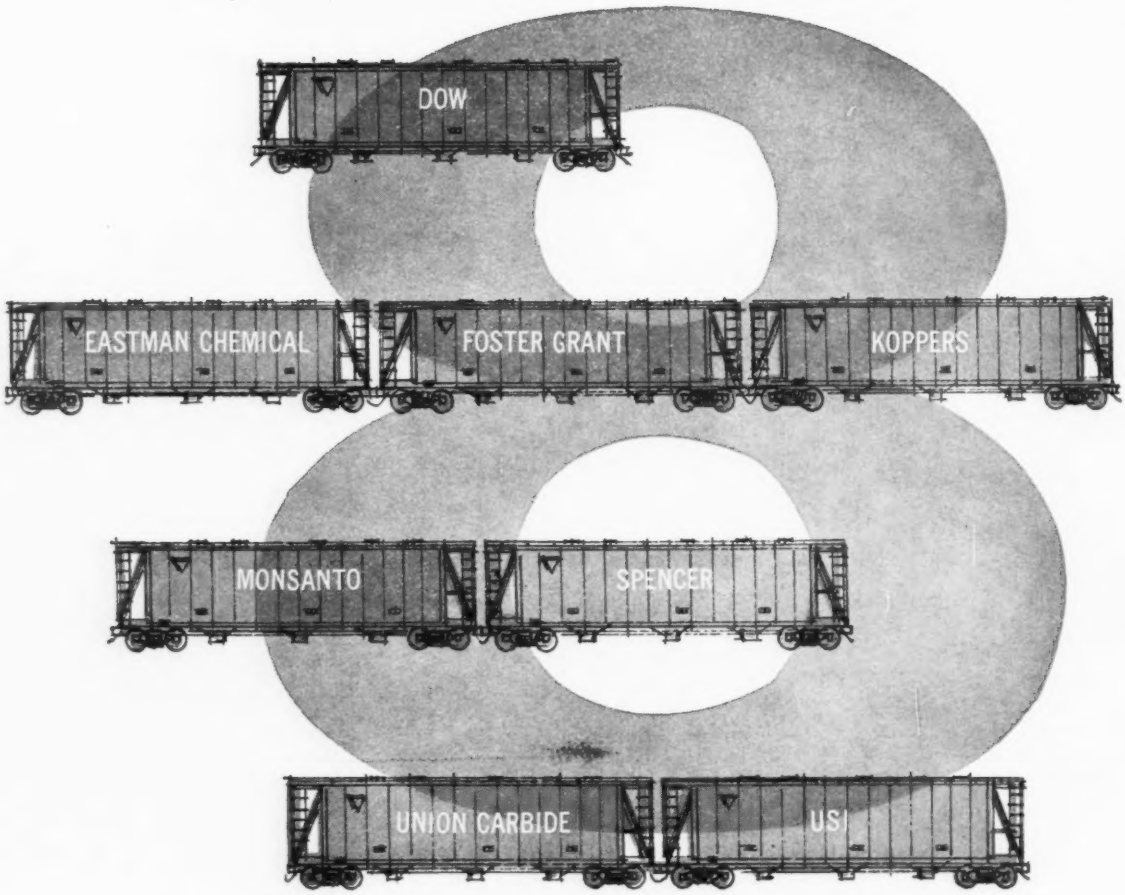

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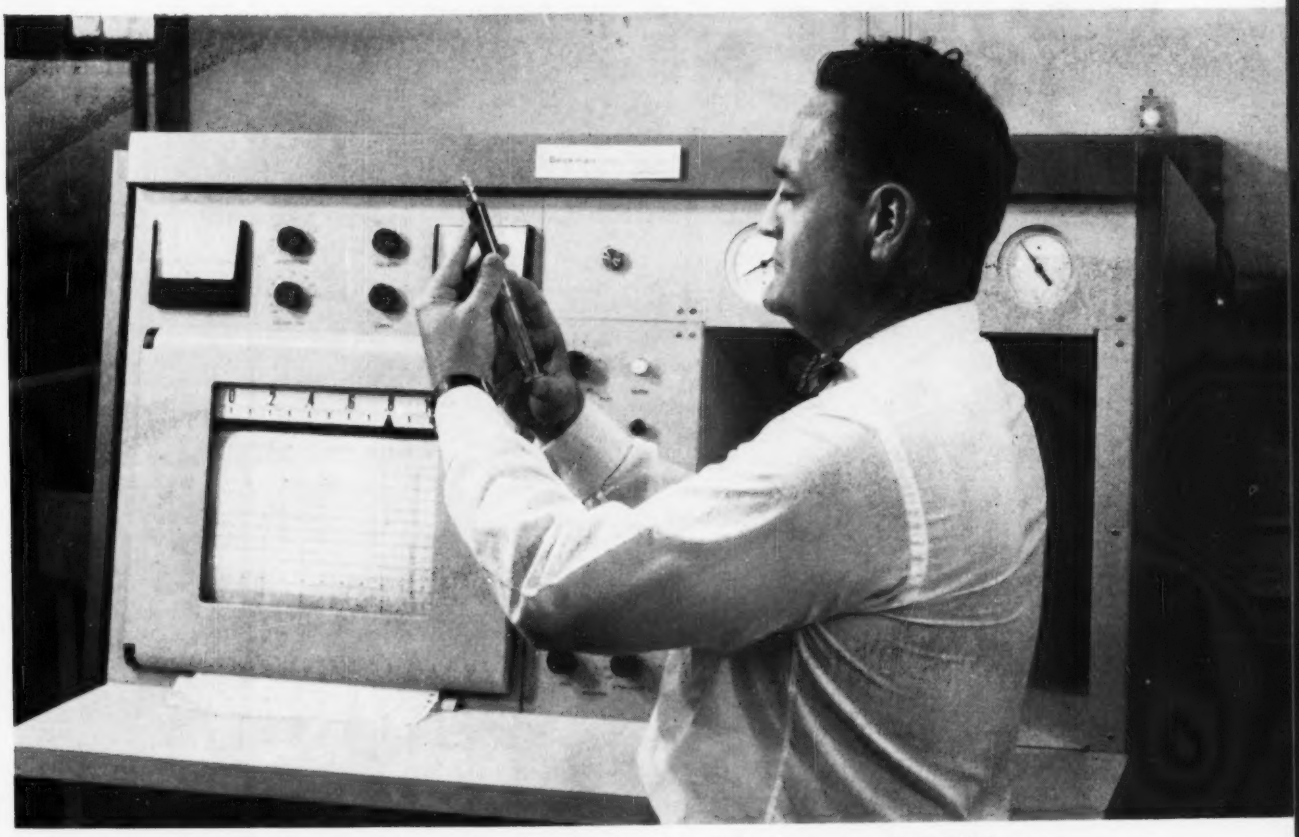

Beckman's Noebels readies Megachrom to winnow new chemicals from complex mixtures.

Sifting Profit Out of Offbeat Organics

This week new equipment is speeding gas chromatography's metamorphosis from analytical tool to producer of high-purity research chemicals. Instruments tailored for production are now offered by Beckman Instruments (Fullerton, Calif.), Podbielniak (Chicago), and Perkin-Elmer (Norwalk, Conn.). And in many labs, hand-built variations of chromatography columns are helping to find quicker, cheaper ways to isolate complex organics.

At least one commercial use of chromatography is near. In a few months, Hormel Institute of the University of Minnesota (Austin, Minn.) expects to offer small quantities of gas chromatography-produced methyl eicosapentaenoate, methyl docosahexaenoate and methyl arachidonate. These are used in lipid metabolism studies, will be offered in 99.99% purity. Hormel will employ a Pod-

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bielniak unit with 1-in.-diameter column.

Beckman's Megachrom is currently the workhorse of preparative gas chromatographs, costs about $10,000, can prepare 10 milliliters of ultrapure (*see chart*) compounds such as iso-octane and ethyl alcohol in 30 minutes, or 3 ml. of methyl oleate in the same period. To prepare similar quantities of these compounds by conventional methods would take at least several hours—several days in some cases, says Beckman.

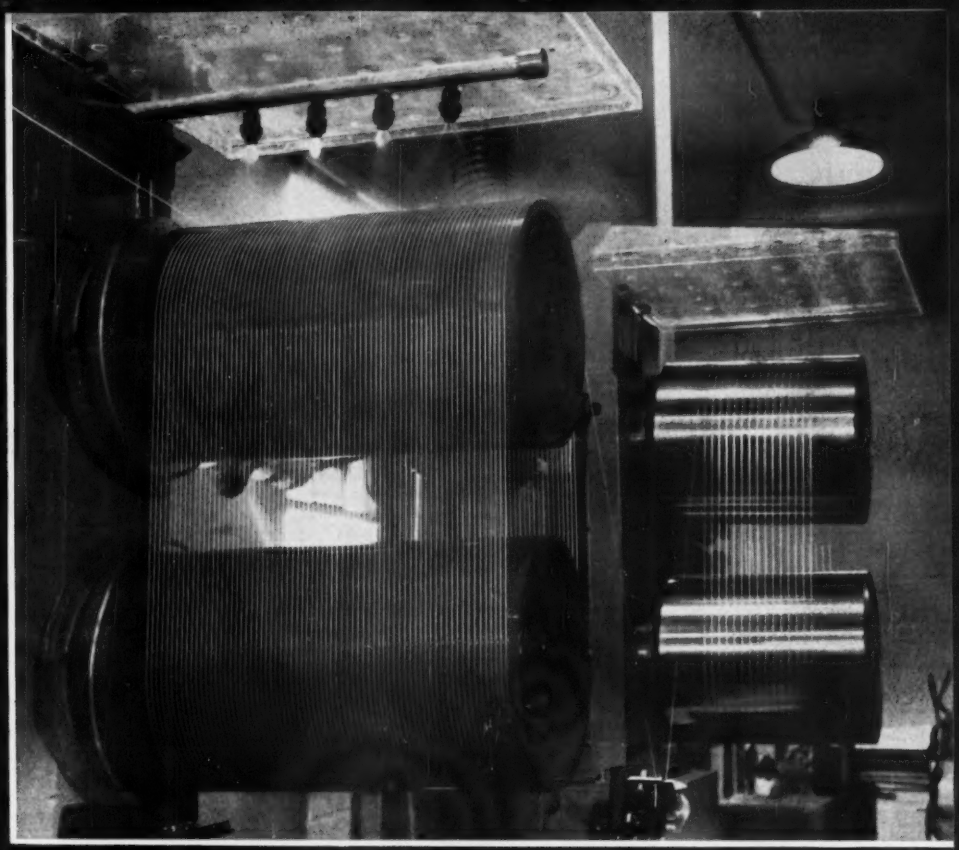
For example, molecular stills cost from $100 to $22,000, depending on their capabilities, but may take two days to prepare 50 cc. of material that the Megachrom would turn out in two and a half hours, it's claimed.

That's not to say, however, that the two devices are even remotely competitive in the CPI. Commercial application of molecular stills, developed by Eastman Kodak and now sold exclusively by Consolidated Vacuum Corp. (Rochester, N.Y.), is well established, notably in removing moisture, odor, color and trace catalyst from plasticizers such as dioctyl phthalate and dioctyl sebacate; purification of waxes; removal of either high or low polymers from mixed silicone polymers; and separation of anhydrous lanolin from wool.

Gas chromatography, on the other hand, is still a long way from finding large-volume uses, although Beckman says one of its customers plans to use a Megachrom to prepare pure chemicals that will be packaged and sold. And Henry Noebels, manager of applications engineering for the firm's scientific and process instruments division, expects the device to find wide use in separating complex mixtures to yield high-purity fractions for use in "feeding experiments, organoleptic tests, chemical reactions, and as analysis standards."

Spin vs. Soak: There's a difference in principle, of course, between the two types of separators. Centrifugal molecular stills spin a thin, uniform film over a heated surface under vacuum. Conditions can be precisely controlled to yield the required fractions, which condense as distillate.

The new chromatographs are scaled-up analytical instruments that handle comparatively large liquid samples and collect the separated fractions of these samples. Heated



Experimental tire cord yarn being spun at Buckeye Technical Laboratories in Memphis

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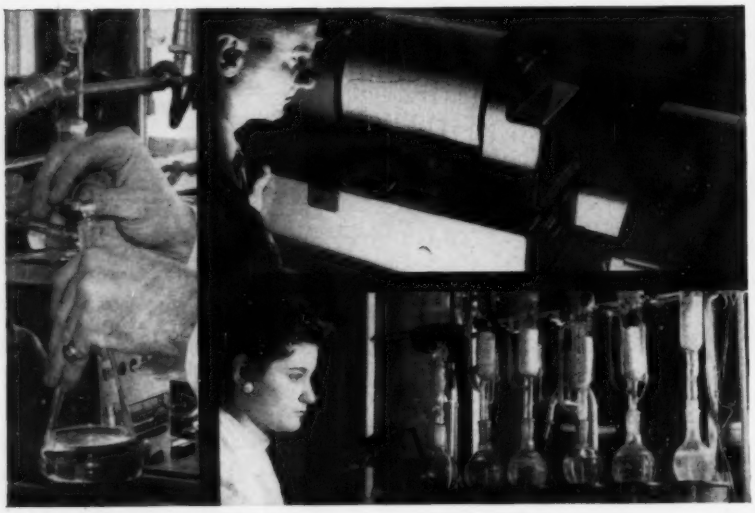

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carrier gas is passed through a chromatographic column packed with inert solid (kieselguhr) coated with a partitioning liquid, the "stationary phase." Samples are separated as they are swept through the column, depending on their molecular affinity for the partitioning liquid.

Megachroms are being used by Dow Chemical (Pittsburg, Calif.), U.S. Bureau of Mines (Laramie, Wyo.), textile producer Deering-Milliken (Spartanburg, S.C.) and American Petroleum Institute at Carnegie Tech (Pittsburgh, Pa.).

Spelling Out Considerations: Podbielniak has sold Montecatini a 2-in.-diameter chromatographic column, designed for separating low-boiling (20 C) hydrocarbons. Such a big column, P. J. Turkal, Podbielniak chemical engineer, points out, can handle more volume but with less selectivity than can thinner tubes. (An alternative is to use several smaller-diameter columns in parallel.)

An important element of design is carrier liquid—e.g., silicone grease or polyester succinate. The liquid should have a vapor pressure of 0.05 to 0.01 mm. of mercury. If it has high vapor pressure, it tends to come out with the sample.

And processing rate, too, bears on column efficiency. If too much sample is vaporized in the column, the separation efficiency drops off markedly.

As a rule, gas chromatography should not be tried until the mixture is down to four or fewer components. Consequently, preliminary distillation is usually necessary.

Podbielniak's 1-in. column (such as Hormel uses) costs about $6,000; the 2-in. unit for Montecatini cost $15,000. Perkin-Elmer offers an even less costly, although less versatile, instrument. Its Model 154-D Vapor Fractometer handles samples as large as several milliliters, sells for around $3,000. Typically, it can separate 0.3 ml. of pure *trans*-dichloroethylene from 1 ml. of the isomeric mix of *cis* and *trans* forms.

In all cases, end-product cost is not the significant consideration. Hormel, for example, isn't worried about cost—its line of 24 biochemicals is offered as a service rather than for profit. The issue: Do you need to go to gas chromatography to get required purity? If that's the case, there's no other choice.

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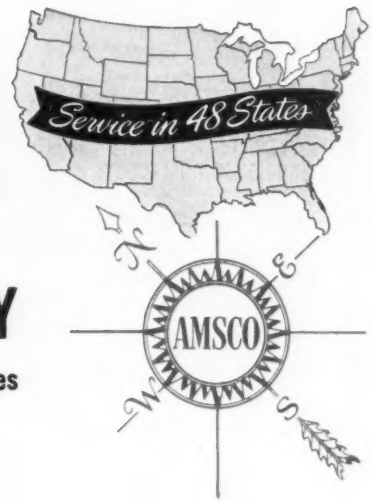

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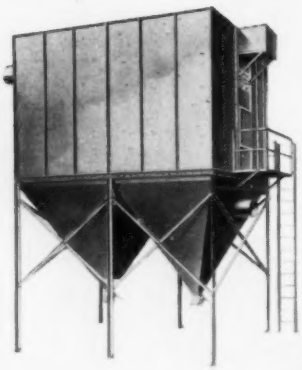

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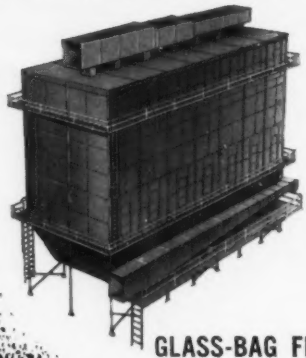

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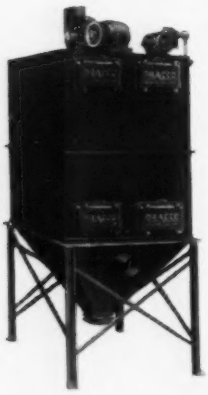

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Continuous Way to Whiter Waxes

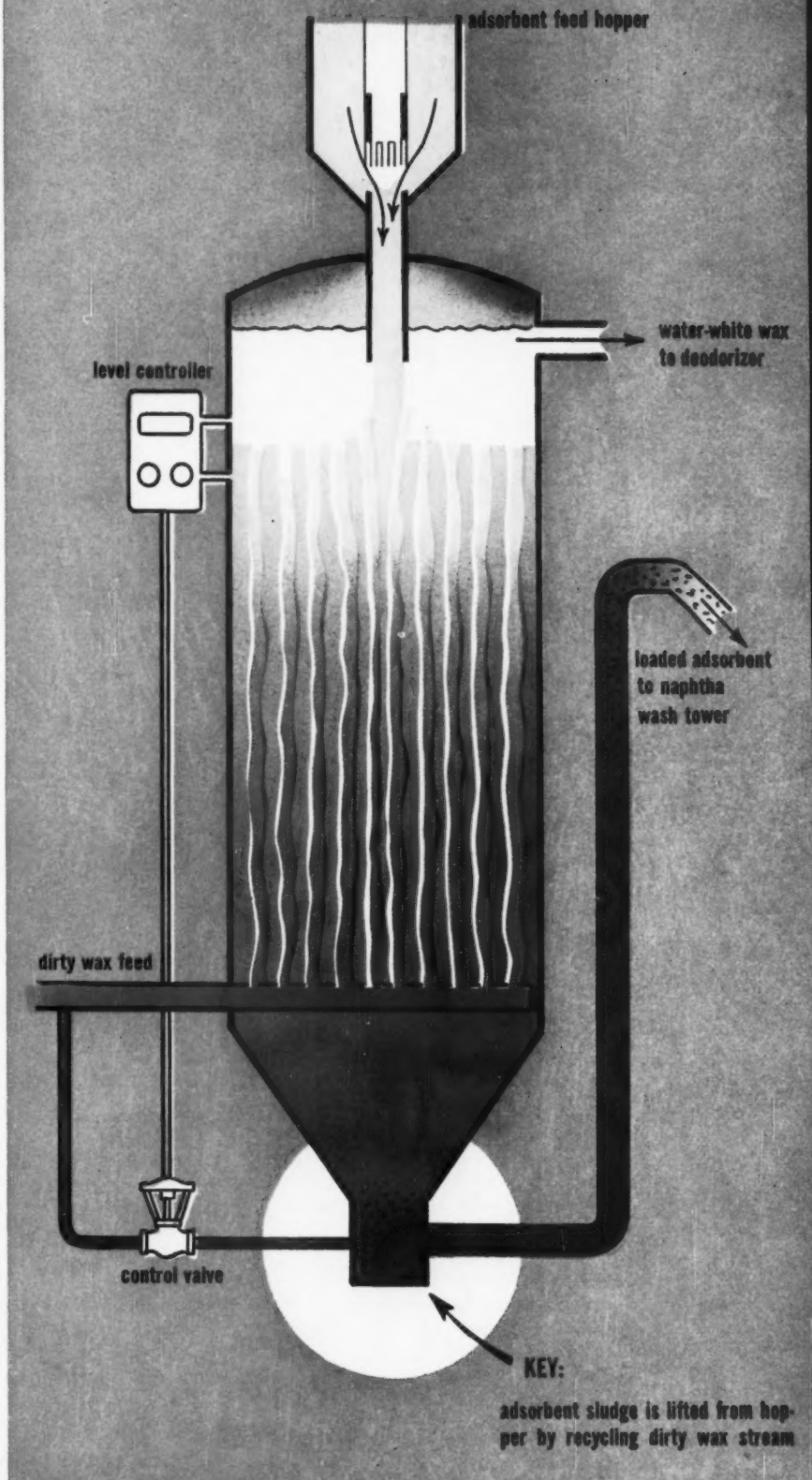
In Chanute, Kan., this week, Western Petrochemical Corp. is preparing to start up a novel wax-decolorizing plant—the first unit of its kind to employ Socony Mobil's Thermofor Continuous Percolator for clay adsorption. A key part of WPC's current expansion program, the wax plant is designed to turn out 200 bbls./day of water-white microcrystalline waxes to meet the increasing demands of the packaging industry.

Packaging—milk cartons, frozen-food wrappers, and the like—has already helped shift microcrystalline wax from by-product to coproduct status. In doing so, it has spurred some sharp process modification. WPC's continuous percolation system is the latest of these refinements, is claimed to offer several advantages over conventional static-bed adsorption techniques. Moreover, Socony believes, these pluses will show up not only in wax processing but also in the decolorization of other liquids. Here are the advantages claimed for the Socony Thermofor process:

- It takes lower initial investment —plant costs are reduced by as much as 25-35% by elimination of multiple processing units required for cyclic batch operations.
- It has lower operating costs—continuous operation requires less labor, minimizes loss of adsorbent, runs at optimum decolorizing conditions.
- It results in improved product quality—continuous recycling of adsorbent guarantees complete decolorization, prevents the slight carry-through that commonly occurs near the end of batch decolorizing cycles.

Cost Comparison: These advantages were made clear during comparative studies of the available decolorizing processes, studies that WPC commissioned Litwin Engineering Co., its general contractor, to make. In all, four routes were investigated—two employing batch regeneration of adsorbent, two using continuous cycles.

First considered was the conventional static-bed process, which uses three percolator towers operating in parallel. While melted wax is per-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KEY:
adsorbent sludge is lifted from hopper by recycling dirty wax stream

colated through one tower, the adsorbent bed of the second tower is washed with solvent naphtha. At the same time, washed adsorbent from the third tower is emptied onto a conveyor belt and transferred to a kiln for batch regeneration.

The second type of unit studied was a regenerative-type process with two percolator towers. One tower is kept onstream, while the adsorbent in the second is washed and regenerated by burning in place.

The third was a process employing one percolator tower from which adsorbent is continuously lifted by a vertical screw conveyor. This process was rejected because of the inherent difficulties of handling sludge with a screw conveyor, and the lack of pilot-operation experience.

The fourth candidate — Socony's continuous percolator — won, hands down, in the final cost comparison, based on engineering designs and investment estimates, plus a cost estimate of one year's operation.

Litwin's actual figures:

	Initial investment	*Annual operation*
Socony unit	$110,000	$ 60,400
Regenerative	$172,500	$112,900
Conventional	$156,000	$101,000

Operating Advantages: The operating advantages of continuous percolation are best shown by the development of the art of decolorizing petroleum waxes.

Originally, paraffin wax was extracted as a by-product from lubricating oils to lower their pour-point. The oil was chilled and the wax allowed to settle out. This settling process has since been replaced by a variety of solvent dewaxing processes in which the wax is extracted with a solvent, crystallized by chilling, and separated from the solvent by filtration or centrifugation (*CW, Aug. 8, '59, p. 53*).

The color of waxes separated by these methods was satisfactory for most uses, since the products had passed through several refining processes with the lube oils.

But when modern packaging uses increased the quality requirements for water-white waxes, a further step was introduced—at first, it was the "hot contact" purification: melted wax was mixed with a granular adsorbent (activated carbon, Fuller's earth, bauxite, or various natural and synthetic adsorbents) and the mixture was heated. Spent adsorbent was then separated from the decolorized wax by standard filtration methods and then discarded.

The hot-contact method was inexpensive enough for by-product wax processing; but as the demand for decolorized waxes increased, it became uneconomical. Refiners then switched to the conventional static-bed process, which was the simplest process for continuously decolorizing the wax, at the same time permitted recovery of spent adsorbent.

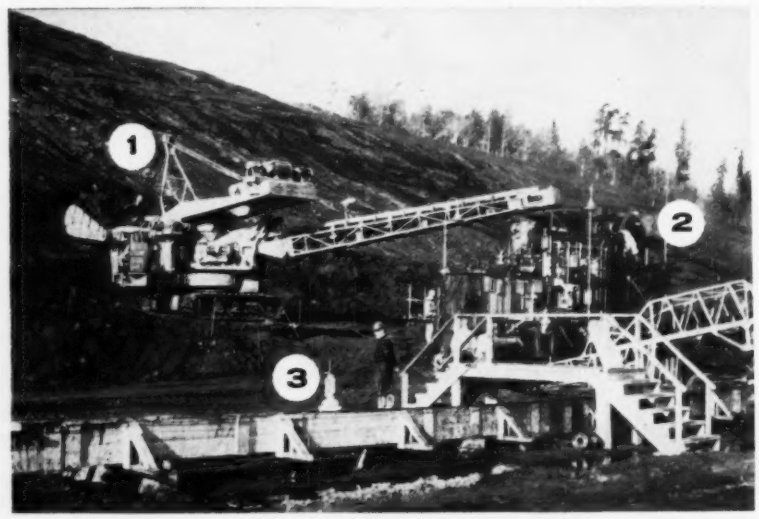
The static-bed process, however, has many of the disadvantages associated with batch regeneration—e.g., operating costs remain high, waxes produced are not perfectly white. Wax color varies from white, when a fresh bed of adsorbent is put onstream, to straw color at the end of a cycle. The merchandised product is a blend of these extremes.

Continuous percolation avoids the color problem. It is countercurrent, so that the product wax has final contact with freshly regenerated adsorbent. The adsorbent is withdrawn continuously; quality does not vary. Moreover, continuous operation permits closer control, reduces labor requirements.

Solids-Handling: Key to the Thermofor Continuous Percolator is its ingenious solids-handling system. Wet adsorbent sludge presents tricky problems—it's too thick to be handled by a screw conveyor, too sticky to empty from a bucket conveyor.

Socony engineers solved these problems by "diluting" the sludge, drawn off at the bottom of the percolator, with liquefied crude wax, to get an easily handled slurry with high solids content.

This transfer system is duplicated in the wash tower where solvent naphtha is percolated through the spent bauxite to wash out wax. The wax and naphtha are recycled from the top of the tower; washed bauxite is carried from the bottom of the



Traveling Extraction Plant

Newest attempt to wring petroleum out of the vast reserves of oil sands (*CW Technology Newsletter, Jan. 23*) along Canada's Athabasca River is being spearheaded by this novel team of mining and processing equipment. As the mining machine (1) chews its way through surface deposits of the bitumen-bearing sands, a self-propelled extraction pilot plant (2) tags along, separating the crude product from the worthless sand. Pipelines (3) supply bitumen-derived diluent to the traveling process unit, return dilute crude product to a central location for subsequent thermal cracking and storage. Cosponsors of the project: Cities Service Athabasca, Inc.; Imperial Oil Ltd.; Richfield Oil Corp.; Royalite Oil Co., Ltd.

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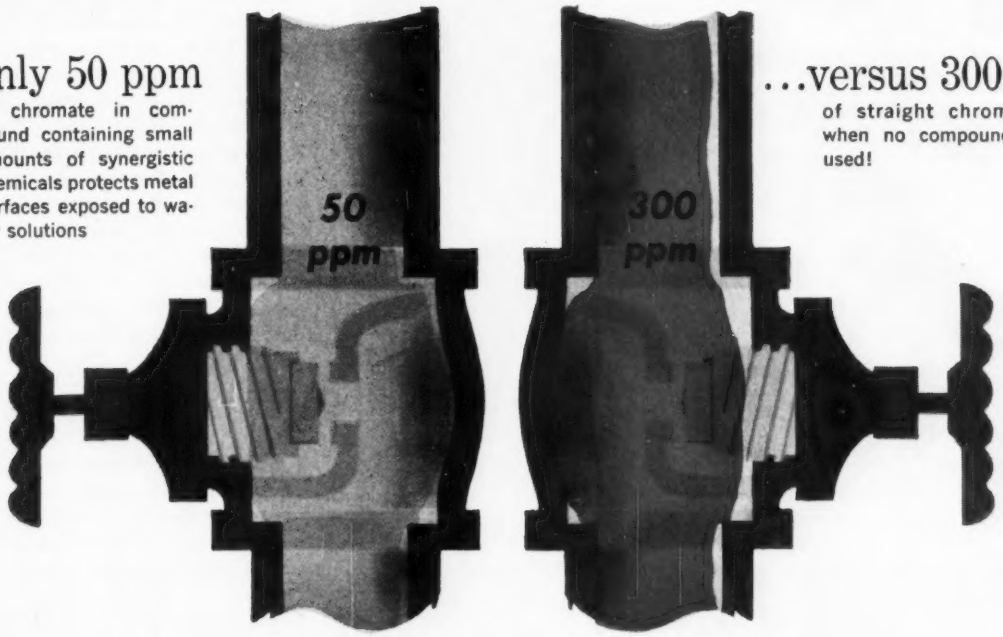

...versus 300 ppm
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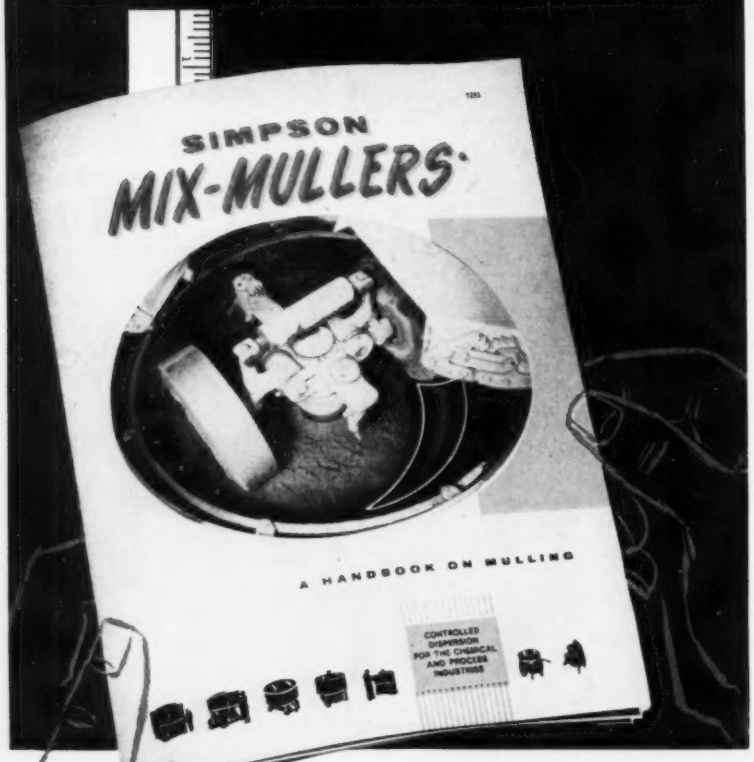

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Will *your* materials preparation facilities *measure up* to the production and quality control standards that are already in sight for the '60s?

If you mix dry solids, this 12-page bulletin is specifically designed to make you dissatisfied with "hit or miss" mixing practices. It reveals how *controlled dispersion* is being achieved by Mix-Muller users . . . processors who have already realized that "cement mixer technology" takes an expensive toll at today's raw material prices. Take a yardstick to controlled dispersion . . . write for a copy of your new HANDBOOK ON MULLING.

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wash tower in a sidestream of solvent naphtha to a drier, where the naphtha is boiled off and recovered for recycle.

The dried granular bauxite, which can now be handled by bucket conveyor or air lift, passes through a regenerating kiln, then back to the hopper at the top of the wax percolator. From the hopper, it falls into the percolator vessel and settles through a rising current of molten wax.

White wax product from the top of the percolator passes through a blotter press and a vacuum deodorizer tower on its way to storage.

WPC is looking forward to a smooth startup of its continuous percolating unit, since its design is based on successful experience with similar units used in decolorizing lube oil in England and with a large pilot unit operated in the U. S. by Socony Mobil. While continuous percolation's advantages don't justify scrapping existing static-bed units, it's likely to replace them as fast as they become obsolete. Latest word is that it is also used to bleach sugar.

Tungsten Plater Debuts

The National Bureau of Standards has developed a method by which high-purity tungsten can be plated onto metal and ceramic surfaces.

Simple to use, and producing a pinhole-free coat, this method may find wide application in the fabrication of rocket and missile nozzles, jet engine parts, and vacuum tubes.

As NBS describes it, the part to be plated is put in a ceramic-lined cylinder, and the air around it replaced with hydrogen. The part is heated to about 650 C in an induction furnace. Then tungsten hexafluoride vapor and hydrogen are passed (under flow control) into the cylinder in a ratio of three volumes hydrogen to one tungsten hexafluoride. When the gaseous mixture comes into contact with the heated part, the hexafluoride is reduced and tungsten deposited.

Platings 1/16 in. thick have been obtained in an hour, compared with 0.001-in. platings produced in the same time by electrodeposition. The new method can be used on shapes that can't be handled by flame-spraying techniques (*CW, Dec. 13, '58, p. 27*). Deposits are denser (19.3 gm./cu. cm.) than flame-spray compacts.

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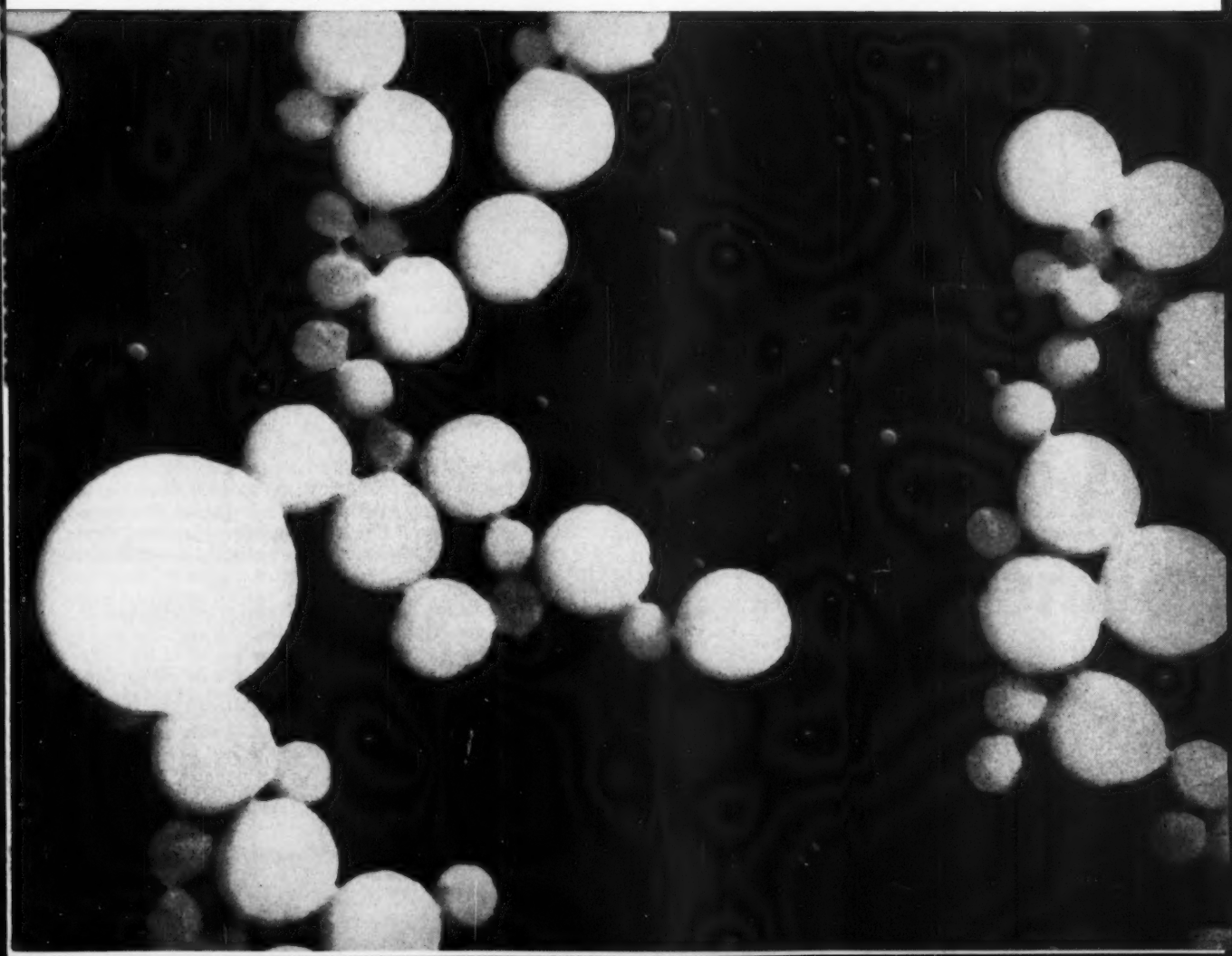
Electron micrograph of polyvinyl acetate emulsion



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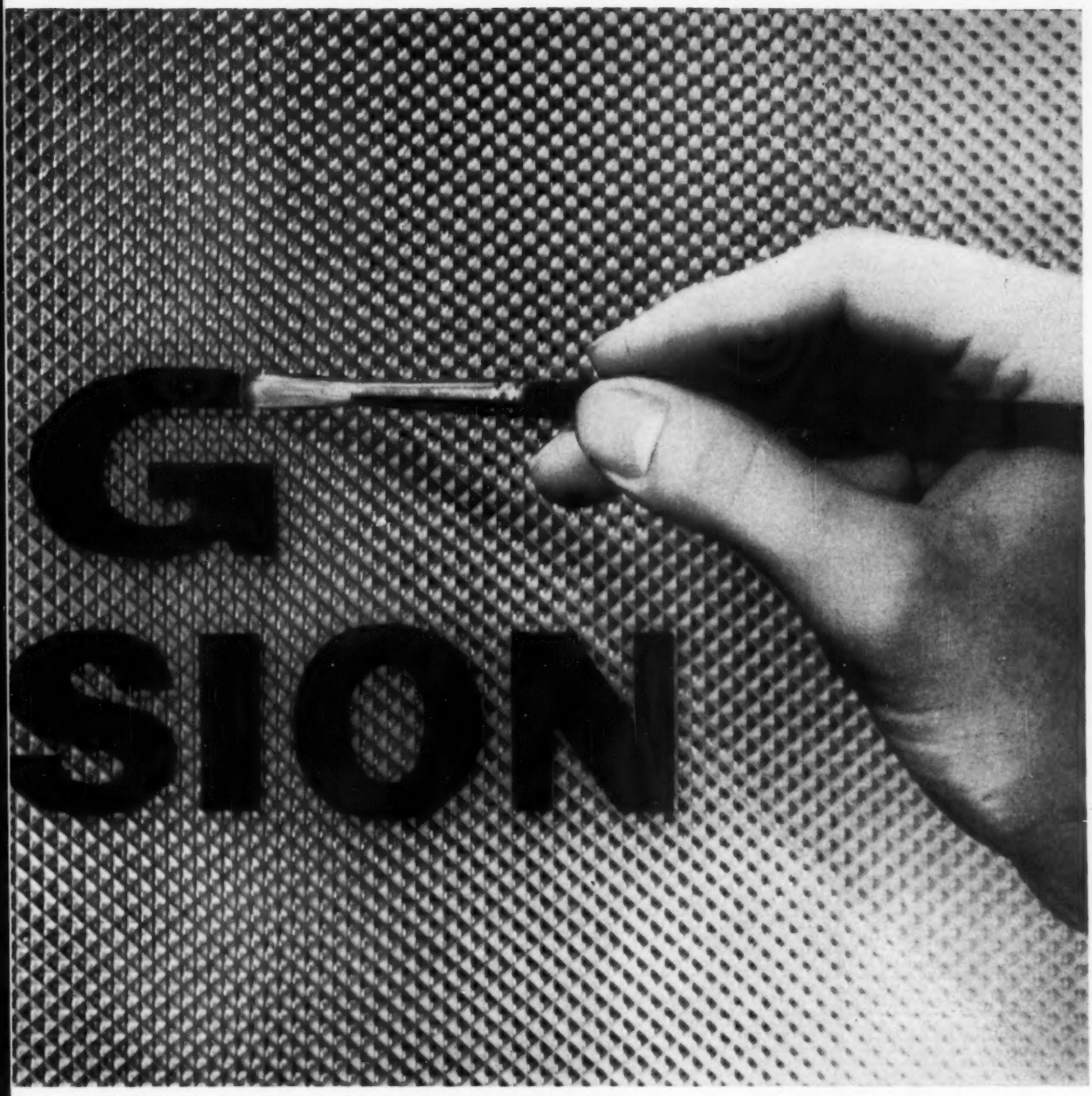
It takes only a matter of minutes to change the name on an office door. But it took months of planning to organize St. Regis' all-out program to meet the ever-changing needs of our shipping bag customers. Now, with expanded facilities, we're prepared to serve you better than ever before.

The new St. Regis Bag Division was developed to provide you with four important services: *the right bag* for your product, *the best equipment* to fill it, *an engineering staff* to help reduce your over-all packaging costs, and, wherever possible, *new packaging systems* and methods.

It's so complete in every way, we call this new program *Packaging-In-Depth.*

It was made possible by consolidating St. Regis'



basic Multiwall organization with four highly-successful and respected paper and textile bag companies. We now offer a *complete* product line: multiwall, burlap, textile, mesh . . . whatever you need. We now have *13 manufacturing plants* for more efficient coverage of key areas throughout the country where industries depend on bags for shipping their products. In these areas, a complete staff of packaging engineers is ready to give you skilled service quickly.

Our research and development facilities are now available to all segments of the new Bag Division, to explore and perfect the most advanced, most efficient packaging methods.

One thing more. The people who *make* your bag are best qualified to supply the bag filling and closing machinery for your operation. St. Regis actually designs and produces the most complete line of packaging machinery in this field: more than 50 different models.

To sum up: more *diversified* services to offer . . . more *specialized* people to meet your needs. And though our men have *years* of experience in many fields, the spirit of St. Regis' new Bag Division is young and eager. We look forward to serving you soon.

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Technology
Newsletter

CHEMICAL WEEK
February 6, 1960

Butadiene makes a better base for solid propellent than do urethanes, according to a North American Aviation, Rocketdyne Division spokesman. James Medford, senior analysis engineer, says Rocketdyne studies show that butadiene propellents have greater resistance to tear and strain, less tendency to slump, and better case-bonding capabilities than does polyurethane. Medford believes that butadiene propellents assure the feasibility of solid rocket motors with 2-million-lb. thrust.

•

Self-fluxing blast furnace feed is the goal of a research project now under way at Allis-Chalmers laboratories (Milwaukee, Wis.). Key: combining iron ore, limestone and coke in a single, heat-hardened pellet for fast, uniform contact. Ore reduction would be more immediate, result in substantially less fuel consumption and greater furnace output. The pellets would also cut material-handling and freight costs.

•

Lime-calcining costs may be cut 15% by use of grate-type kilns, which permit calcining of fines, predicts Allis-Chalmers. Dow Chemical is installing a 600-tons/day A-C "grate-kiln" system scheduled for startup late this year at Ludington, Mich. Although A-C kilns debuted in the cement industry a few years ago (*CW, Jan. 28, '56, p. 92*), Dow's plant will be the first U.S. use in making high-calcium lime and caustic burned dolomite.

Key to fines calcining: charge preheating, which completely calcines undersize material before it enters the kiln. In conventional kilns, fines tend to congregate in the center of the charge, are therefore only partly calcined. Estimated savings are based on 15% lower fuel needs and elimination of waste fines, which commonly account for more than 15% of the raw material.

•

The elusive cold virus has been grown outside the human body for the first time, by British researchers. C. H. Andrewes, director of the common cold research unit at Harvard Hospital, in Wiltshire, says his group's achievement is an "entering wedge" toward conquering colds.

A liquid-fueled rocket engine that can be restarted in flight had its first "hot" ground test at Lockheed Missiles Division test base (Eagle Mountain, Santa Cruz County, California) last week. Called the "Restart Agena," it might allow a satellite in polar orbit, for example, to be switched into an orbit around the equator.

•

A new family of epoxy resins—epoxidized polyolefins—has been introduced by Food Machinery and Chemical Corp. Compared with conventional epichlorohydrin bisphenol epoxies, the new resins offer lower density, less costly curing and easier handling. Each molecule has 5-8

cross-linking sites (including vinyl groups), thus allowing a greater curing versatility than current resins that have only two functional groups available. First markets will probably be in noncoating applications.

Although different polyolefins can be used, polybutadiene is the backbone of the first three new resins offered, called Oxiron 2000, 2001 and 2002. Differing in viscosity, these three are produced by adding hydrogen peroxide to a mixture of polybutadiene and acetic acid in the presence of an ion-exchange-resin catalyst. Up-to-drum quantities are produced in pilot facilities at Baltimore.

•

A new aluminum anodizing process, developed by Toro Manufacturing Corp. (Minneapolis), is said to be 10-50 times faster than usual methods. It also features more efficient use of electricity, reduced refrigeration requirements, and lighter color. Toro won't disclose chemical details except to say that a conventional electrolyte is used. But the firm reveals that the process is carried out around room temperature (vs. 25-52 F for other methods), requires current density 20-40 times greater than the usual 20-100 amps./sq. ft., and deposits 0.001 in. of aluminum oxide in one minute.

Commercial plans for the new process aren't yet firm, Toro says. But it is working up plans for a plant, envisions applications in hard-coating pistons, gears, helicopter blades and has tried the process on lawnmower parts.

•

The first nuclear reactor exclusively for biological research will be built at Argonne National Laboratory (Lemont, Ill.), an AEC facility operated by the University of Chicago. Named Janus, it will be used to study the results of both high and low doses of fission neutrons in small animals, may provide new information on how to guard against harmful radiation. Estimated cost of the project, slated for operation in early '61, is $560,000.

•

A new synthetic rubber process that yields castable polyurethanes was disclosed last week by Farbenfabriken Bayer AG. (Leverkusen, Germany). It's essentially a two-step process—in the first, diisocyanates (e.g., 1,5-naphthalene diisocyanate) react with linear polyhydroxy compounds, such as glycol-adipic acid polyesters having molecular weights of 1,000-3,000; in the second step, the product diisocyanate-polyester reacts with glycols at about 100 C to yield the cross-linked rubber.

Keys to castability, says Bayer, are the use of excess diisocyanate —four to five times more than the calculated hydroxyl-group number of the polyester—followed by use of unsaturated glycols, such as butenediol. Castable polyurethanes are reportedly "extremely well suited" to production of automotive accessories, yield special properties—over 300% elongation, tensile strength of 300-400 kg./sq. cm. (4,200-5,700 psi.), elasticity of more than 30%—"not known before in plastics processing."

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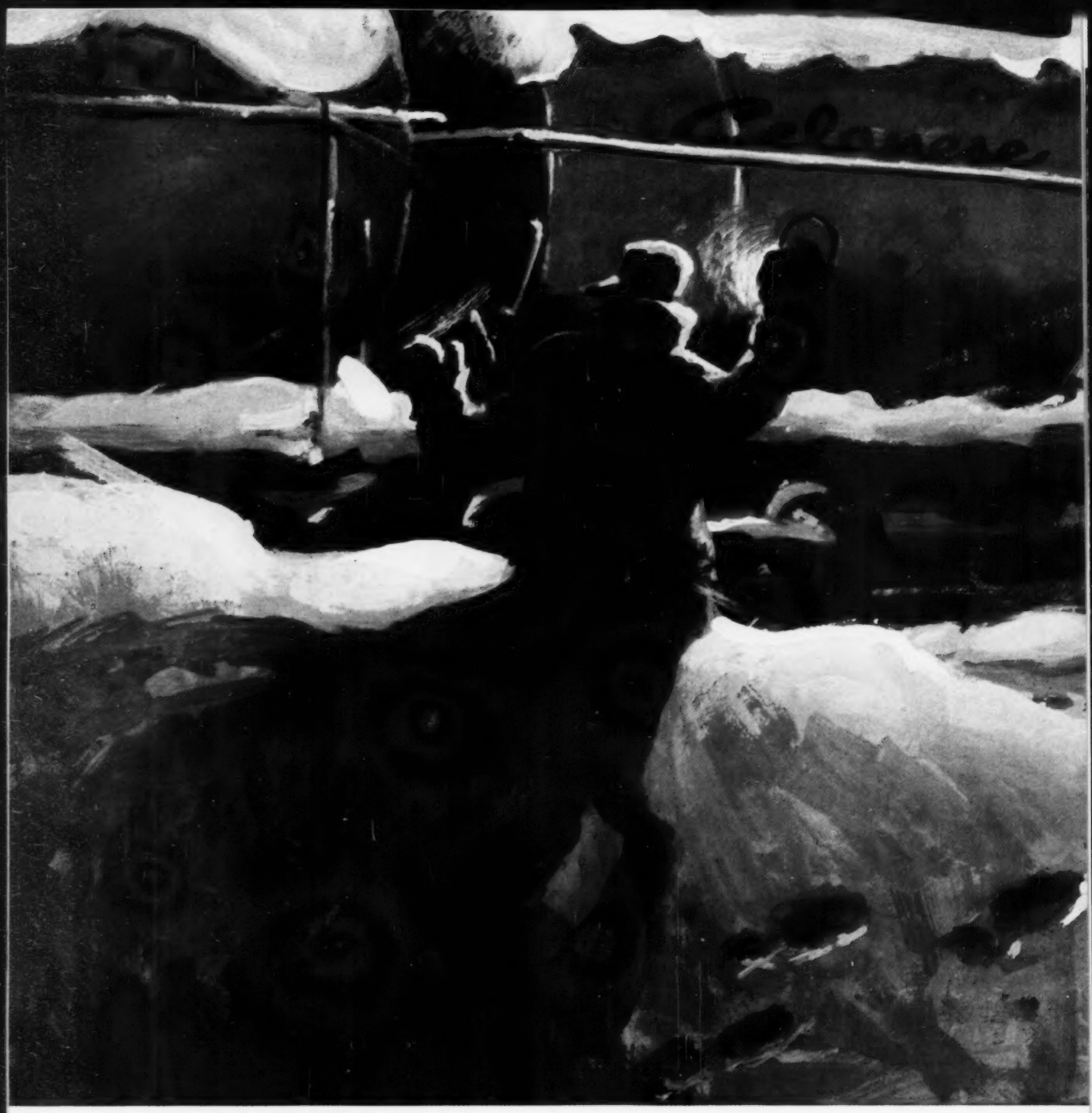

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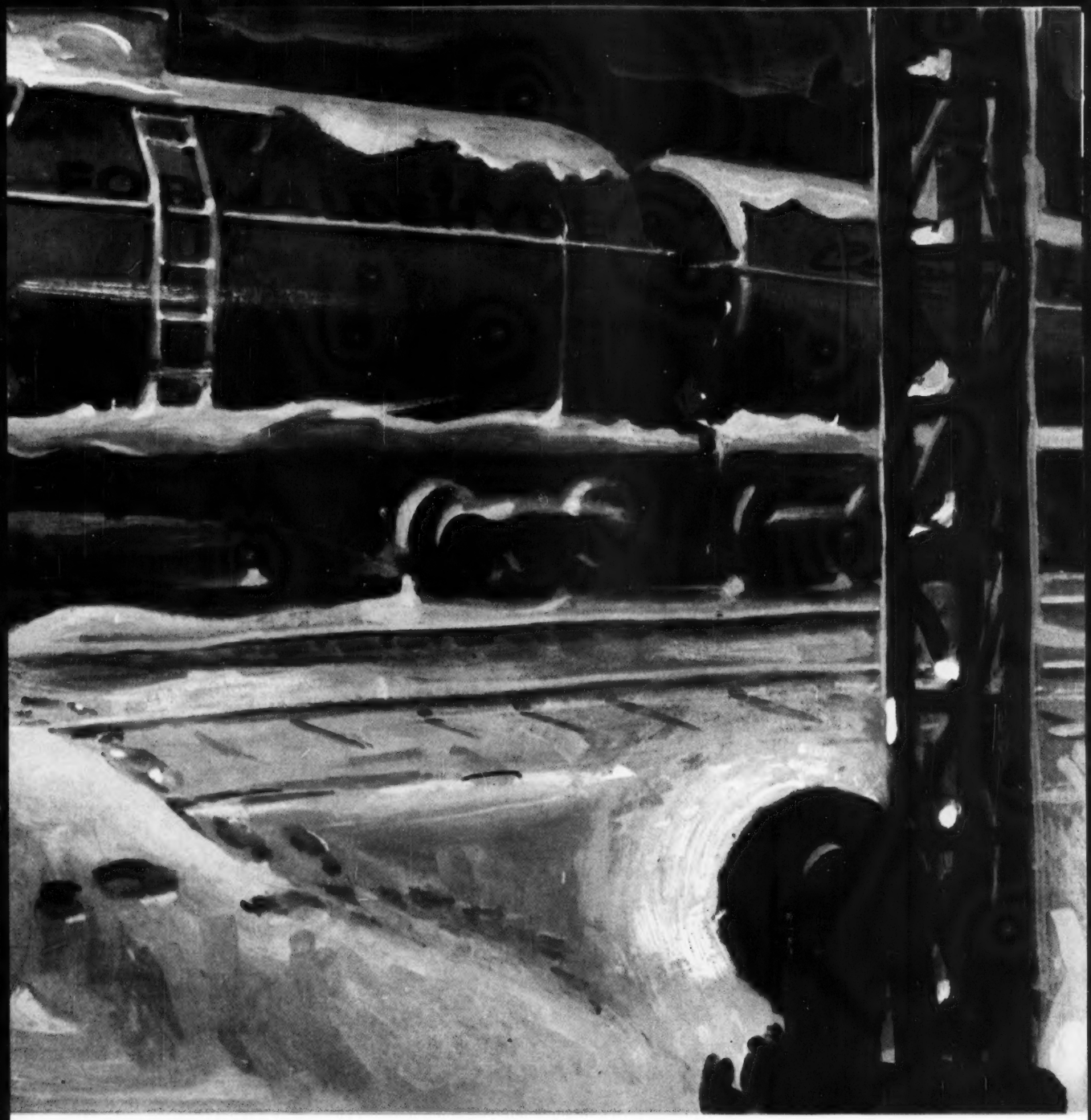

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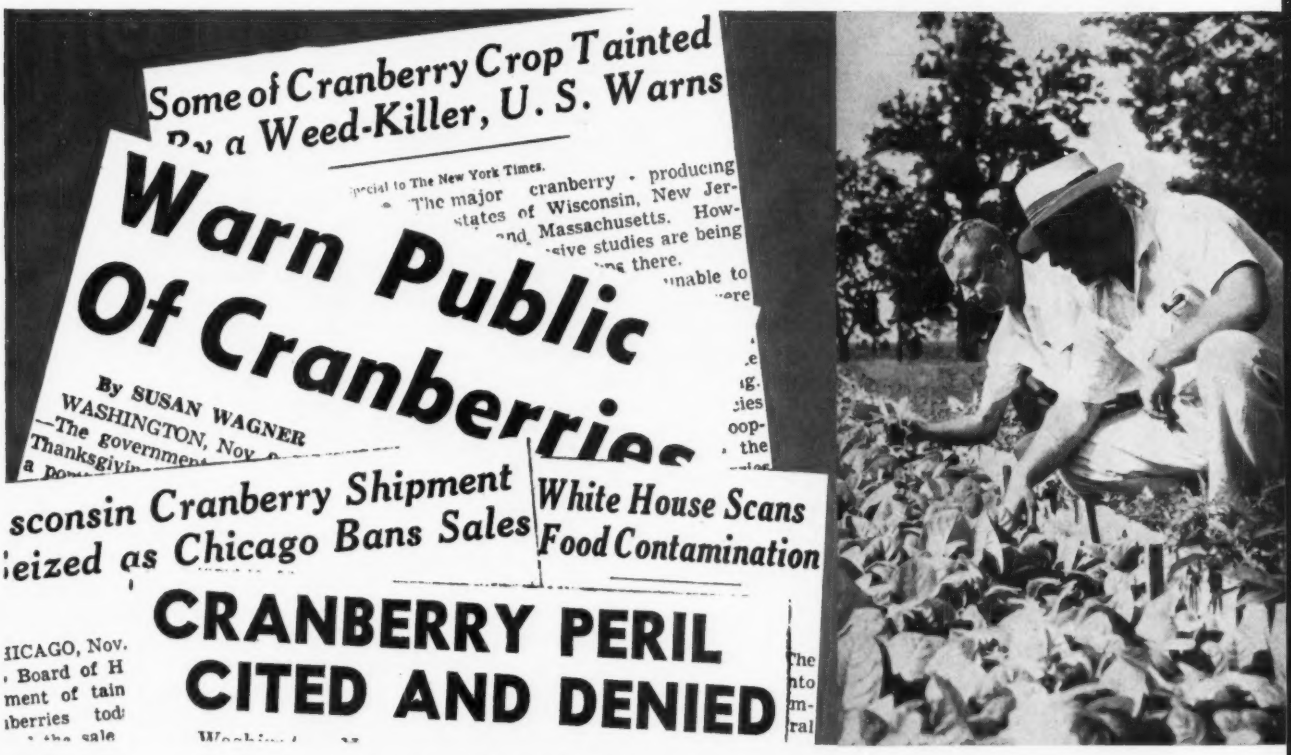
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Pesticide 'scare' reports spur makers to all-out educational program aimed at ending farmer misuse.

'Scare' Headlines Jar Ag-Chemical Makers

Agricultural chemical marketing men—concerned about the market-disrupting effects of recent "scare" reports involving chemical pesticides—last week turned their attention to the just-opened Congressional hearings on proposed food additives legislation.

Pesticide makers are worried that the hearings, which are certain to resurrect the cranberry-aminotriazole incident, will culminate in a call for tougher government controls.

Their fears are grounded in recent Food & Drug Administration moves (1) prohibiting the use of diethylstilbestrol for fattening poultry, (2) prohibiting the use of the insecticide heptachlor wherever residues of heptachlor, or heptachlor epoxide, a breakdown product, may be demonstrated on treated crops. New evidence is said to prove that some epoxide residue finds its way into meat and milk of livestock.

Some pesticide producers figure these moves are just the warmup for a sweeping campaign against all pesticides. But additional action patterned on the heptachlor decision is not on the docket. FDA officials tell CHEMICAL WEEK that they have no evidence of other pesticides breaking down into toxic substances under field conditions.

Market Rumble: Pesticides represent a big and growing market for agricultural chemical producers. In '59, more than $278 million worth of pesticides at the manufacturer's level ($580 million retail) helped U.S. farmers in their fight against losses from insects, weeds and fungi, losses estimated to top $10 billion annually.

The '59 sales add up to about seven times the $40 million worth of pesticides used in the U.S. in '39, virtually all of which were inorganics. Since the early '40s—when DDT came into widespread use—annual consumption of synthetic organic pesticides has grown to 600 million lbs.

But these impressive sales figures might be cut back seriously, say many pesticide marketing men and spokesmen for the National Agricultural Chemicals Assn., if another "cranberry incident" should occur.

So far, none of the major producers of pesticides has reported any evidence of a sales decline. In fact, monthly sales in November and December in the Southeast topped '58 levels.

While it may be too early to notice any sales dip, pesticide makers figure they'll certainly know by May. Consensus: barring any extremes of natural conditions (which could kill many insects, curtail pesticide demand) or another wave of "scare reports," sales should reflect continuing growth.

About 60% of all pesticide sales are made to farmers, most of whom will want to continue using the materials, it is felt, to boost crop yield and quality. About 20% of total U.S. pesticide production is exported,

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and the remaining 20% is purchased by nonprofessionals — homeowners and others who likely may show some fear of agricultural chemicals because of the bad publicity pesticides received in recent months.

But even a 10% drop in sales to the latter group would mean a total decline of only about 2%, say marketers.

Producers React: To offset adverse publicity, makers are going into action. Virtually every company in the business has planned exactly what it will do if hit by a toxicity problem. Public relations staffs have been briefed, following the example of American Cyanamid when it was faced with the aminotriazole crisis (*CW, Nov. 21, '59, p. 42*).

Moreover, most companies have stepped up their educational efforts aimed at keeping the middlemen and ultimate consumers (the farmers) fully informed of products' hazards, uses, proper handling methods. This means more bulletins, mailings, speeches before distributor-farmer meetings, more films and slide presentations.

One agricultural chemicals sales manager put it this way: "We're going all-out to give our customers a short course on 'how to avoid pesticide trouble.'"

Most pesticide makers have long carried their share of the responsibility for educating consumers about the hazards of their products, already employ a wide variety of means to warn users of dangers, specify exactly how to use the products.

Much of the blame for farmer misuse of pesticides has been placed on local formulators and distributors, who, in their zeal to sell, may overlook much of the precautionary information needed for safe use.

Nevertheless, nearly all companies contacted by CHEMICAL WEEK say they are stepping up these efforts. Many companies mention programs patterned after ones already in use—but bigger.

New Programs: Other approaches are new. Example: Dow Chemical Co. is cosponsoring (along with National Assn. of County Agricultural Agents) a tour next summer for 50 county agents from all parts of the U.S. Purpose: to widen their horizons by showing them farm problems over a broad area of the U.S., particularly those involving pest-control measures.

Dow initiated the program last summer, giving 12 county agents a three-week, 3,500-mile tour.

Big Debate: While most pesticide producers plan to expand their consumer education programs, many are not sure just how they'll accomplish it. Big questions facing pesticide sales and promotion managers: "Shall we beam our precautionary and how-to-use information to the general public (at high cost) and help remove the stigma now attached to chemical pest-killers? Or should we channel our information to processors and users of our products?"

Industry sources say the balance swings back and forth, depending on the prevailing actions of government officials.

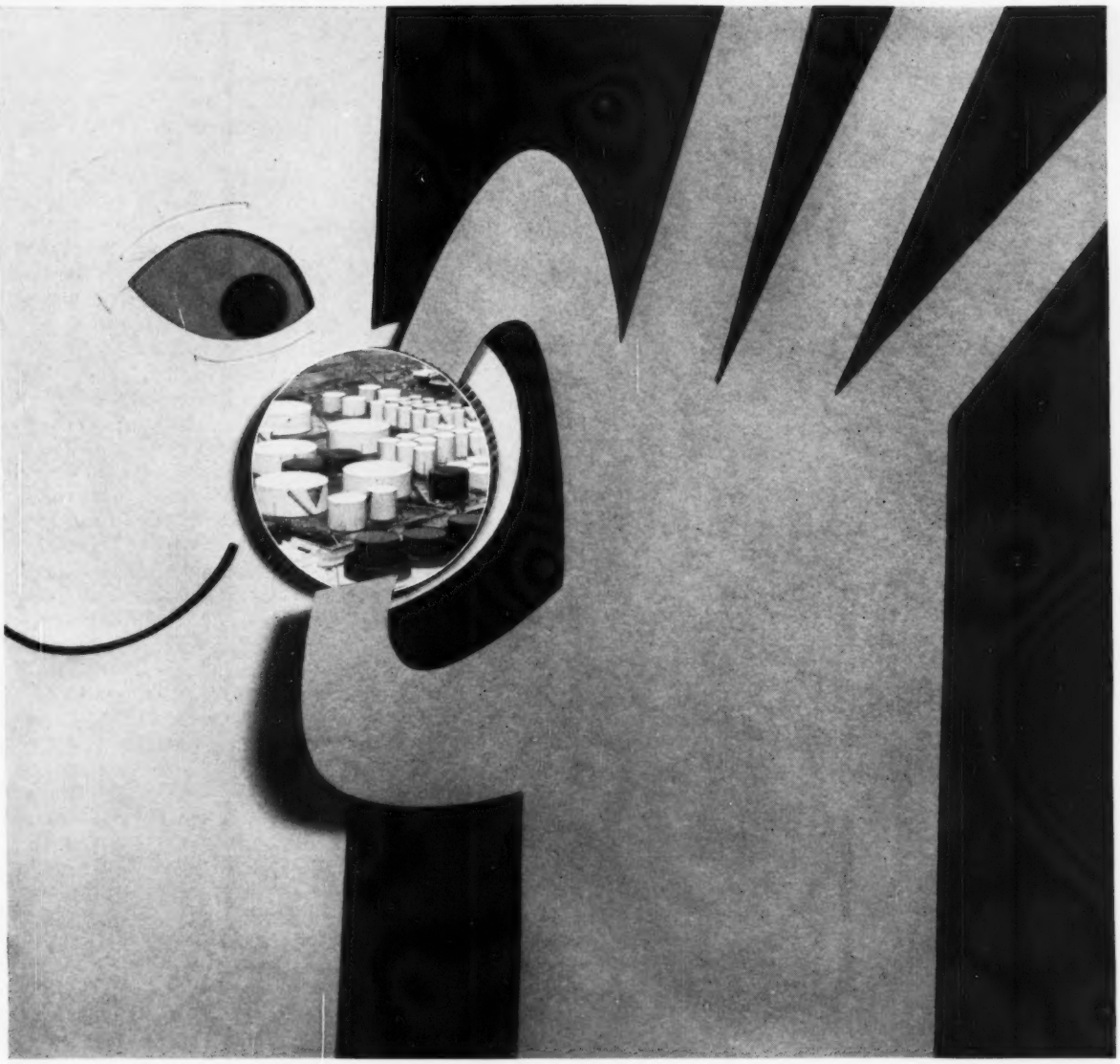
Top-Level Struggle: Meanwhile, government agencies are also debating how to handle pesticide problems. Secretaries Benson and Flemming have been at odds for weeks over the handling of the aminotriazole and stilbestrol incidents.

Flemming feels he is only carrying out the law as Congress intended it. Benson is pushing hard to head off any more "scare announcements" involving other agricultural commodities, wants to "put the question in focus."

Farmers' Views: While many farmers are unhappy with Flemming's handling of these matters, few are disenchanted about the use of pesticides. Most realize they need pesticides to reach peak output, maintain top quality. They are getting the "read-the-label" messages from all sides. But they fear chemical companies will hike prices to pay for the increasing costs of research and development.

Makers of agricultural chemicals figure it costs $200,000 to $1.5 million to develop a single chemical pesticide from a research candidate to a commercial product. Involved in this expense are two or more years of fundamental studies, covering basic research and screening of compounds; long-term field and toxicity tests; development of analytical test procedures and optimum process conditions; and application for government registration of the compound and its label.

Producers report the get-tough policy on pesticide residues has already forced them to toss out promising



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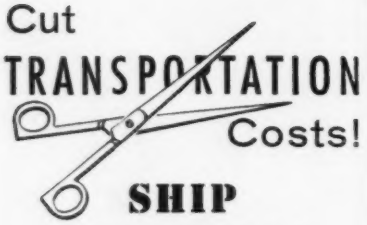

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new chemicals because they just can't justify a toxicity gamble on all of them with stakes so high. This trend is sure to continue.

Labels themselves will get careful consideration. Justus Ward, chief of USDA's pesticide regulations unit, tells CHEMICAL WEEK that his Washington staff will be increased 60% (from 38 to 61) so that all applications for label registration can be scrutinized more closely. Re-registration of labels (required every five years), essentially automatic in the past, will now get a much closer look.

Prospects: In coming months, chemical companies likely will beam an unprecedented volume of "read-the-label" messages at farmers and formulators. While it's only a good bet that users will follow the directions more closely than ever before—now that the consequences of misuse are so well known—this much is certain: pesticide marketing men, who once considered the vagaries of nature their biggest sales challenge, now figure the toxicity problem is the principal obstacle. It will doubtless be a tough problem for a long time.

Focus on Sales Terms

Disturbed by the "boom-year" talk last week at the National Chemical Credit Assn. meeting were a group of chemical process industries sales managers, treasurers and credit men. Their concern stems from their belief that conditions today contain all the elements necessary for another weakening round for credit policies, as customers play one chemical supplier off against another.

This bearish attitude was evident in more than corridor conversations at NCCA's Cleveland meeting. It was the frank consensus of 100 CPI sales and credit managers and treasurers, representing about 80 firms, that: (1) bills will be even harder to collect in '60 than in '59; (2) the large inventory buildup in the first half of '60 will be followed in '61 by a recession.

Forecasts of very good business in '60, plus a continuing tight-money supply, have alerted credit men to a sobering possibility: good customers —those who could afford to pay on the customary 30-day-net term basis —will be asking for more time without being pegged as poor credit risks.

Says one treasurer, "It used to be a matter of urgency and pride for a company to pay its bills on time—even if it had to borrow money to do it. Something seems to have happened to that old standard; now, good companies are asking for longer terms, without any qualms. They're beginning to lean on the bigger suppliers."

How Much Leaning: The big question confronting credit men this year will be, "How far do we go in permitting such leaning?"

Says one credit manager, "If the supplier companies would all hold the line, there would be no problem. But there's always a supplier hungry enough for the business that he will use any means, including extension of net 30 terms, to get it."

Says another, "We always have tried to get our sales people to sell quality-of-product rather than terms-of-sale. But, under today's conditions, we have to remind them more often."

Fears of a not-distant recession stem largely from suppliers' belief that their customers will build inventories beyond what they need. Loosening credit terms would fit into such a trend only too well, some credit men warn.

Fear of Inflation: Dow Chemical Co.'s Treasurer Robert Bennett, speaking on the chemical industry outlook for first-half '60, said, "One of the great concerns of today is the fear of inflation, and it's certainly possible that in the next several years increasing profits will be used up in meeting increased wages, salaries and other costs."

Pointing out that it's not always easy to increase prices to compensate for inflationary pressures, Bennett said, "Our company's price index is down 2% from a year ago, down 6% from '52. This happened while the general price index rose 1% from last year, 13% from '52. I suppose the real reason for this is competition."

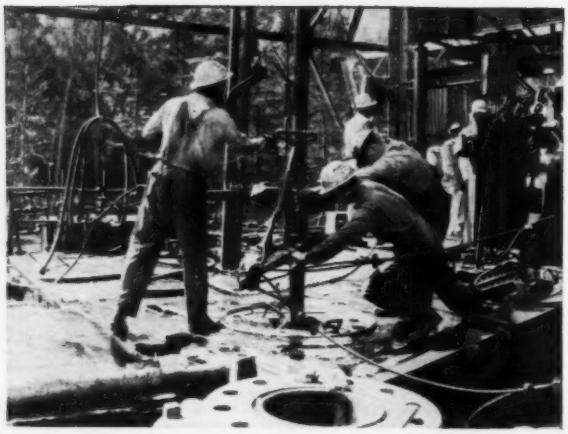
Commenting further on pricing policies, Bennett said, "We want to give increased wages and salaries and increased returns to stockholders, but it cannot be done while other costs continue upward and prices go downward. Our pricing policies must give more and more attention to these 'other' costs, such as local taxes, transportation, social security, and government regulations."

Ethylene oxide unit at Wyandotte's new Geismar Works near Baton Rouge, Louisiana.

WYANDOTTE OXIDES

. . . building blocks for exciting new chemicals

One of the most rapidly brightening horizons in the chemical industry today is the field of alkylene oxides. New products based on the "building block" ability of ethylene and propylene oxides, are coming out of the laboratories at an ever-increasing rate. Boasting more than 16 years of extensive experience in experimental and practical oxide chemistry, plus unexcelled research facilities, Wyandotte Chemicals is a leader in this fertile and diversified area. In oxides, as on other chemical frontiers, Wyandotte is Pacing Progress with Creative Chemistry.



PETROLEUM—Wyandotte products based on alkylene oxides serve the oil industry in drilling muds as demulsifiers, and also find extensive application in the growing area of secondary oil recovery.

NATIONAL DEFENSE—Wyandotte, under the Navy's Bureau of Aeronautics, pioneered in the development of ethylene oxide as a monopropellant for guided missile hardware.

TRANSPORTATION—Many of Wyandotte's oxide products are used in antifreeze, lubricants and hydraulic fluids. Wyandotte research is working on several new products in this field.

WYANDOTTE new milestones in

When ethylene oxide reacts with an "active hydrogen" compound like one of the alcohols, glycols, phenols, amines or organic acids, the new product generally contains a hydroxyl group which can, in turn, react with another molecule of ethylene oxide to form *another* new product. This chain reaction, subject to designed controls, offers unlimited possibilities in the development of new products.

STAGGERING POTENTIAL

When you add to this the fact that you can use ethylene oxide alone, propylene oxide alone, and that you can use them in random mixtures or ordered blocks, you begin to see the *infinite variety of products* that alkylene oxides can spawn.

THE BEGINNING

Wyandotte's interest in oxide chemistry reached sharp focus in the early days of World War II with the synthesis of allyl alcohol from propylene glycol. Then came investigation into the production of glycol ethers for hydraulic fluids and the production of PLURONIC® block-polymers with their impact on surface-active chemistry.

A MAJOR DISCOVERY

The outgrowth of this work in block-polymers led to what is considered one of Wyandotte's major contributions in the field of oxide chemistry. Namely, nonionic surfactants produced by sequential condensation of propylene oxide and ethylene oxide with low-molecular-weight reactive hydrogen compounds . . . and how discovery of this new molecular structure for nonionic surfactants was used to synthesize what are now known as Wyandotte PLURONIC polyols and TETRONIC® polyols.

THE FIRST COMMERCIAL BLOCK-POLYMERS

The PLURONICS were the *first* block-polymers to be successfully employed commercially as nonionic surface-active agents. And continuing research into alkylene oxides has led to Wyandotte's QUADROL,* MONOLENE,* PLURACOL® E series of polyethylene glycols, PLURACOL P series of polypropylene glycols, PLURACOL TP triols, and many other products still in development stages.

WHAT'S GOING ON NOW?

Present Wyandotte work in the field of oxide chemistry includes the extension of the block-

research triggers oxide chemistry

polymer series towards the development of new uses for our present products, along with new products for urethanes, hydraulic fluids, lubricants, improved surfactants, and hundreds of other applications.

WHAT'S AHEAD?

Continuing research into block-polymers may lead to new methods of bringing about the reactions of oxides with a host of other chemical compounds. Such new reactions would undoubtedly open up *whole new ranges* of products whose resulting applications cannot now even be predicted.

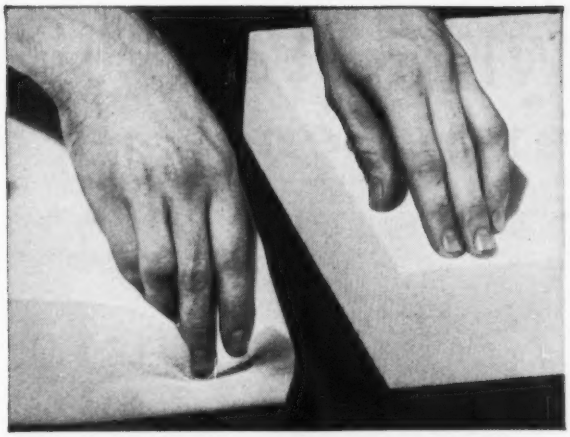
**Quadrol®*—*trademark for N, N, N', N'-tetrakis (2-hydroxypropyl) ethylenediamine*

Monolene®—trademark for N-(2-hydroxypropyl) ethylenediamine

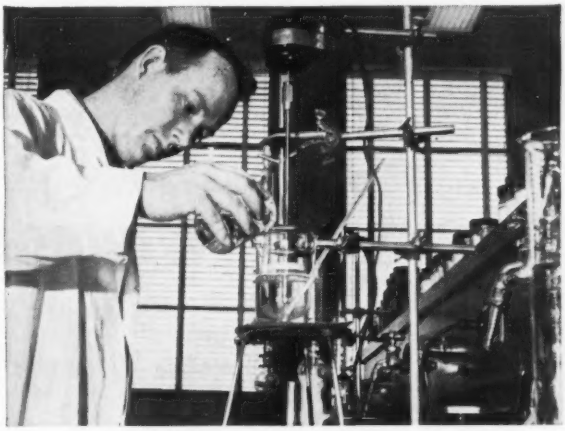
Milestones in Wyandotte's oxide progress

U.S. Pat. No.	Patent Granted	Title
2,441,540	5-11-48	Production of allyl alcohol.
2,479,632	8-23-49	Catalytic production of allyl alcohol from Propylene Oxide
2,503,050	4-4-50	Process for producing aldehydes by isomerization of olefin alpha oxides.
2,521,170	9-5-50	Process for aldehydo isomerization of olefin alpha oxides.
2,577,256	12-4-51	Polyoxypropylene-benzene-sulfonamides.
2,600,654	6-17-52	Chromic oxide-cadmium chloride-cadmium oxide catalyst.
2,600,655	6-17-52	Chromium oxide-tungsten oxide-iron oxide gel catalyst.
2,601,538	6-24-52	Catalytic isomerization of propylene oxide to propionaldehyde, catalyst therefor and synthesis of catalyst.
2,674,619	4-6-54	Polyoxyalkylene compounds.
2,677,700	5-4-54	Polyoxyalkylene surface active agents.
2,716,137	8-23-55	Catalytic condensation of α, β, alkylene oxides.
2,718,509	9-20-55	Plasticized resin compositions.
2,786,080	3-19-57	Stabilized polyoxyalkylene compositions.
2,855,370	10-7-58	Catalyst

Please turn page ▶



PLASTICS—Wyandotte oxide products are widely used in the mushrooming production of many grades of polyurethane foams—in flexible, semi-rigid and rigid forms—for myriad uses throughout industry.



CHEMICALS—Because they are versatile, reactive, and meet high industrial standards, Wyandotte oxides are widely employed as chemical intermediates.

MEDICINE—Pluronic F68, one of Wyandotte's many oxide products, is employed as an emulsifying agent in therapeutic fat emulsions . . . an emergency source of calories for the injured.

(Continued from previous page)

Where can you use Wyandotte's experience in alkylene oxides?

Whatever oxide products you use, it will pay you to investigate their purchase in tank-car quantities from Wyandotte. The savings are substantial and the quality is uniformly high.

WHATEVER YOUR BUSINESS, if it involves oxide chemistry there's a good chance you can effectively use Wyandotte's experience.

It's quite possible one of Wyandotte's oxide products can improve your present product or assist in one you're developing—broaden its application by adding or changing chemical or physical properties.

For skilled assistance in the use of Wyandotte oxide products—detailed technical data—or other specific information—fill in and mail the coupon below.

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☐ Monolene [N-(2-hydroxypropyl) ethylenediamine]
☐ Pluracol E (polyethylene glycols)
☐ Pluracol P (polypropylene glycols)
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☐ Tetronic Polyols
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Market Newsletter

CHEMICAL WEEK
February 6, 1960

The international fertilizer market is rapidly deteriorating because of price cutting by all major producing countries including the U.S., Japan, Germany, Norway. There's evidence that foreign as well as U.S. producers are feeling the blows.

Last week, for example, a representative of Mitsui Export Co. took a swing around the U.S., reportedly sounding out American firms on some way to stabilize fertilizer prices. As the Japanese tell it they lose money when selling at marginal rates—but it's less costly in the long run than letting a plant stand idle.

In retaliation against imports of cut-rate foreign fertilizers, U.S. companies are selling overseas at minimal rates—which, of course, hurts foreign producers. U.S. sellers insist they will continue to keep foreign prices at a minimum until foreign producers revise their sales methods here.

•

Heavy-duty polyethylene shipping bags for industrial and agricultural products will be made by Owens-Illinois Glass Co. (manufacture and sales to be handled by O-I's Multiwall Bag Division in Toledo).

Limited production is slated to start in the spring; full production is expected by late summer. Big hopes are pinned on the heavy-gauge plastic bags because of "exceptional strength, eye appeal, effective protection against moisture and contamination, possible savings in package and transportation costs."

•

PE-film overcapacity may be imminent, despite developments such as the O-I move. Just last week, for example, J. L. Rodgers of Union Carbide Plastics warned those at the National Flexible Packaging Assn. meeting in New York that PE-film capacity is now 25% higher than total film use in '59 and that "capacity will continue to increase during the coming year." The rise is attributed partly to a three-fold increase in the number of film extruders since '53, partly to addition of new capacity by existing companies.

On the brighter side, according to Rodgers: growth of some PE-film markets, which could hike film demand more than 100 million lbs. by '63. Expected demands in '63: baked goods, 60 million lbs.; produce packaging, 100 million lbs.; paper products, 15 million lbs.

•

A chemical boom could be in the making for the Calgary-Edmonton area of Alberta, Can. Key: recent installation of a pipeline to deliver relatively cheap propane and butane into the area. Goodyear and Firestone are now building tire plants in Alberta. Although Dominion Rubber (wholly owned subsidiary of U.S. Rubber) has been reported to

be contemplating building in the area, Dominion's president, C. C. Thackray, informs CHEMICAL WEEK that the firm is "not now considering such a plant."

•

Price-shading of cumene-process acetone is creating localized difficulties for other acetone producers. The cut-rate acetone is said to be moving at prices 1¢/lb. or more under list prices.

There's no real fear, though, that the acetone market is heading into a major price war. Reason: cumene-process acetone—a by-product—is available in relatively limited quantities. Competing acetone sellers are being selective about areas in which the lower prices are met. Consequently it's likely that acetone prices in general will remain reasonably firm, with competitive haggling most noticeable in areas of cumene-acetone abundance.

•

A 23¢/lb. price cut on succinic anhydride by Allied Chemical's National Aniline Division (sole domestic producer) brings cost of the chemical to 51¢/lb. in truck loads, 52¢/lb. l.t.l. The reduction is aimed at broadening uses. Prices might come down to the 30-40¢/lb. range, in the event that sales volume markedly increases, according to an Allied spokesman.

Importers who handled the chemical when it was in short supply say there is now no U.S. market for foreign succinic; very high duties in addition to high foreign prices preclude competitive sales in this country.

•

Borden is building its new resin and formaldehyde plant on a 26.8-acre site at Fremont, Calif., about 35 miles from San Francisco.

The installation will have 45-million-lbs./year formaldehyde capacity (tentative completion: April '60) and 50-million-lbs./year resin and emulsion capacity (due in late '60). Design and construction is being handled by Borden Central Engineering Dept.

SELECTED PRICE CHANGES—Week Ending February 1, 1960

	Change	New Price
UP		
Calcium resinate, precip., dms.	$0.04	$0.4025
Tallow, inedible, fancy, bleachable, tanks	0.0025	0.0575
DOWN		
Casein, imp., inedible, acid-precip., grd., Argentine, bgs.	$0.0075	$0.19
Tin metal (Straits)	0.01	1.00

All prices per pound unless quantity is quoted.

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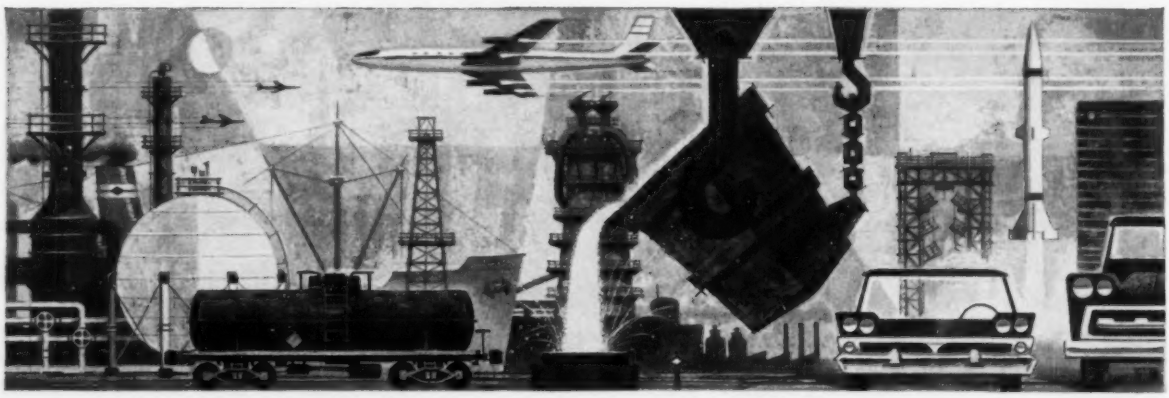

Harshaw Serves 50 Different Industries!

For each of 50 different industries, including the Nation's top 100 industrial corporations, Harshaw produces a variety of important chemicals. For instance, the Petroleum Industry regularly purchases catalysts, metallic soaps, salts and crystals. The Automobile Industry buys electroplating chemicals and anodes, catalysts, fluorides, pigments and metallic soaps. The Chemical Industry uses products from six of our ten industrial divisions.

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No More Guesswork on Reactor Insurance

The Atomic Energy Commission has closed the door on further discussion of its proposed insurance regulation, fixing limits of financial protection required for reactor licensees. CPI companies that have or plan to operate reactors can at last determine just what their "protection"—usually, insurance—responsibilities will be.

Reactor operators, insurance industry and AEC officials have presented their arguments, and the ruling is ready for final commission approval. Indications are that it will be approved and become effective by April 1—the date of the commission's annual review report to Congress on indemnity.

Ruling's Significance: The ruling—the first permanent regulation to codify levels of financial protection—will specify amounts based on the level of thermal power of a reactor, rather than type. An AEC spokesman told CHEMICAL WEEK that, predictably, the insurance industry finds financial levels too low, while operators of less powerful reactors contend the levels are too high. Big-reactor companies haven't complained.

The proposed ruling will affect reactor operators only. They are the ones who have to pick up the sizable tabs on insurance premiums for their proof of "financial protection."

Here's how it works: Assume a CPI company decides to get a 10-mw. reactor. Under the proposed ruling, the company must show itself protected financially up to $2.5 million before it would be granted a license from AEC. It could either insure itself or, more likely, take out $2.5 million worth of insurance.

The only sources of this insurance are the NELIA and MAELU pools. (The letters stand for Nuclear Energy Liability Insurance Assn.—composed of stock-owned insurance companies—and Mutual Atomic Energy Liability Underwriters—made up of mutual companies.) Together, these pools have insurance capacity of $60 million.

Once licensed, the reactor operator receives additional insurance protection. The government indemnifies each reactor licensee with an additional $500 million for both damage and liability, applicable if the insurance proved insufficient in the event of a nuclear incident. Also, under law, not just the licensee but anyone held legally responsible for a nuclear incident would receive indemnity.

Rates are high now. Third-party liability insurance from NELIA and MAELU are figured on a base rate for the first $1-million coverage, de-

If proposed AEC ruling becomes law this much protection will be required by . . .

Reactor Owners

1	Nonprofit, educational institutions	$250,000*
2	Research reactors (not exceeding 10 kw.)	$1 million
3	Reactors rated >10 kw. but <1 mw.	$1.5 million
4	Reactors (other than test reactors) rated >1 mw. but <10 mw.	$2.5 million
5	Power reactors with rated capacity of 100,000 electrical kw. or more	$60 million
6	Testing reactors and all other power reactors and all other reactors rated >10 mw.	$3.5 million to $60 million

Others

For material users, fuel producers, developers, etc: No change under proposed ruling. Nuclear exclusion clauses in insurance policies (NELIA or MAELU), such as transportation and other exclusions, will still be in effect. For isotope users: Damage insurance available from insurance carrier—but not mandatory. Liability covered under present liability plan.

* Financial protection not required; government indemnity applicable beyond $250,000 liability or damage.

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pending on the reactor's thermal power level. The next $4-million coverage is 50% of the base, the next $5-million after that is 20% of the base, and a lower sliding scale applies above $10 million. Base price per year on a 20-mw. reactor would run in the neighborhood of $10,000 for the first $1-million insurance; on a 5-mw. reactor, about $8,000; and on a power reactor, as much as $20,000. Research reactors would be 50% higher the first year but drop back to comparable base price figures after that. Extended coverage for property may run from 20¢ to $1 per $100 of coverage.

Ruling's Value: Since there has been no relevant reactor accident, evaluation of the new ruling cannot be made. No one knows how much and what kind of damage could actually result from such an accident, and only subsequent court determinations could establish completely realistic levels of necessary protection.

As shown in the chart (*p. 85*), educational institutions are not required to show proof of financial protection. Government indemnity covers them above $250,000 liability and damage. This is not part of the new regulation, however. It has been part of the Atomic Energy Act for several years. Principal features of the proposed ruling:

(1) Financial protection of $1 million is required for reactors having thermal power levels not exceeding 10 kw.; $1.5 million for reactors between 10 kw. and 1 mw.; and $2.5 million for reactors with thermal power levels greater than 1 mw. but not exceeding 10 mw.

(2) For reactors having thermal power levels above 10 mw. and for all power and testing reactors, a formula provides amounts ranging from $3.5 million to $60 million. As in the existing (temporary) regulation, the formula is based principally on the thermal power level of the reactor, at the rate of $150 per thermal kw.

A feature of the proposed amendments, however, adds to the formula a factor that takes account of proximity of residents and population density of an area surrounding the reactor.

(3) Another feature requires financial protection and provides commission indemnity before a reactor is ready to go into operation in cases where fuel elements are fabricated before the reactor is ready for fuel loading.

The elements may be shipped to the reactor owner for storage on site until needed. To cover this situation, the proposed amendments require financial protection of $1 million for the holder of a construction permit who is authorized to possess and store special nuclear fissionable material at the site of the nuclear reactor. The commission indemnity would also become operable at that time.

(4) The proposed regulation exempts federal agencies and nonprofit educational institutions from financial protection requirements.

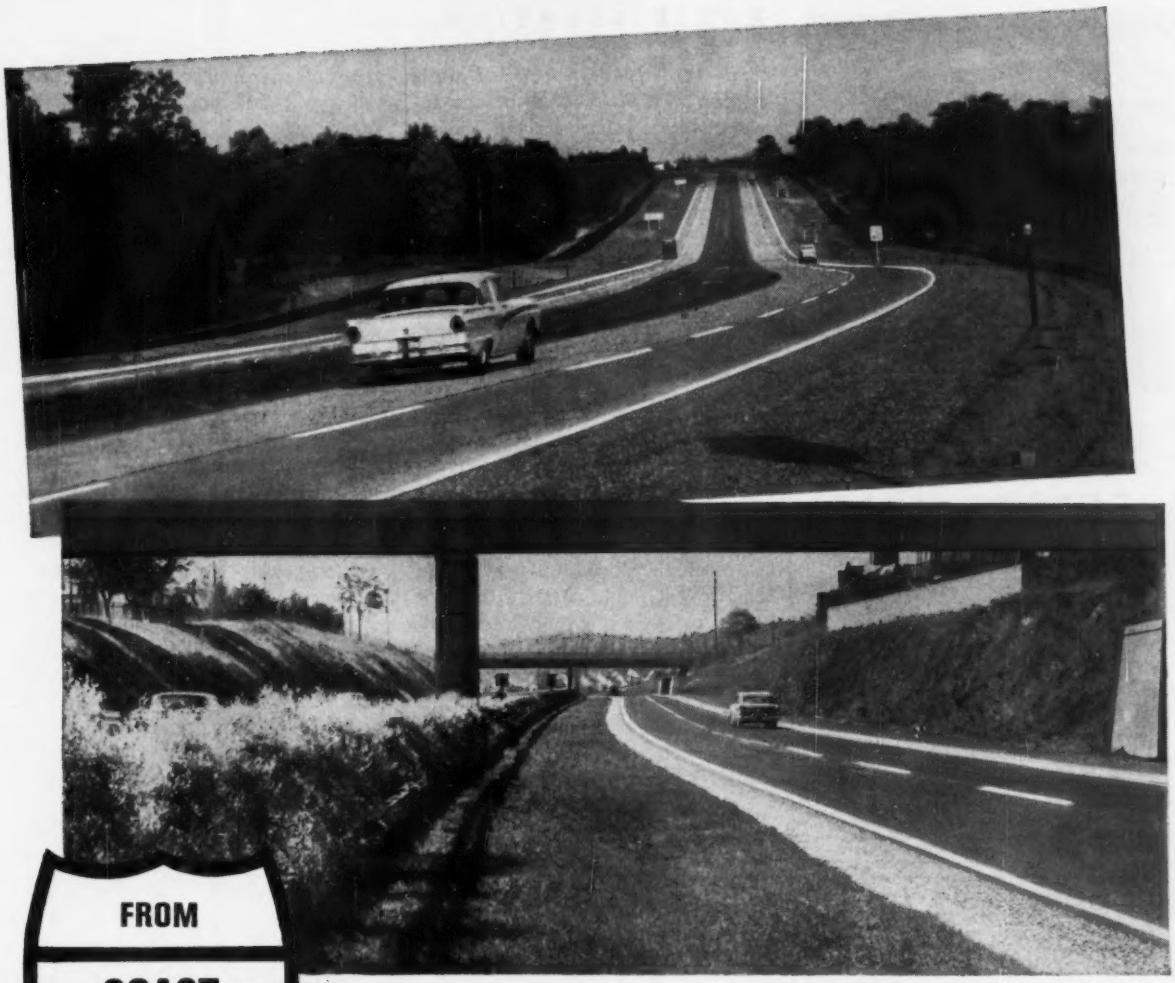
(5) Licensees choosing to rely on their own resources must furnish proof of financial ability.

Ruling's Effect: Comparatively little difference exists between the proposed, permanent ruling and the temporary regulation that has been in effect. Some observers are inclined to think the "permanent" aspect of the ruling has elicited many of the complaints. Premium rates are high, and any increase will be felt. On the other hand, the insurance industry has met the government's request to insure facilities it didn't want to cover. Unfortunately, according to one insurance executive, only time and several nuclear accidents will establish proper insurance levels and fair premiums.

Nonreactor Nuclear Problems: Although the proposed regulation applies only to reactor operators, AEC is currently giving thought to others involved, to a lesser degree, with potential nuclear hazards.

Currently, except in certain "hot" areas, isotope users not directly involved with reactor work have no trouble getting the insurance they want. Insurance against radiation contamination is like fire insurance and can be obtained from insurance carriers, generally at higher rates. Liability to third parties is covered by most liability plans. However, there is now no government indemnification extended to material users who are not under direct contract with AEC.

The commission expects soon to have results from a study on the feasibility of extending its $500-million indemnity to all material licen-



FROM

COAST TO COAST

Edge-markings make roads safer... use this modern aid to driving

NORTH, SOUTH, EAST, WEST—Today all highway signs point to safer driving. Among the many safety devices being used on an increasing number of roads are edge-markings—warning, telltale lines that are becoming companions to center lines to keep motorists alert to dangers on either side.

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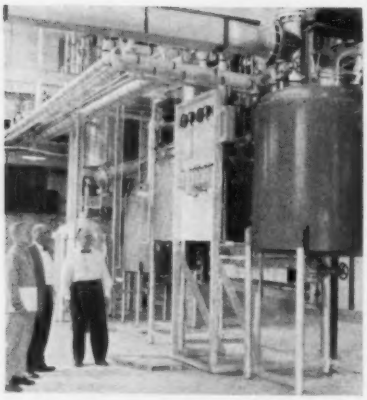

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The newly developed emulsifiable type Fischer-Tropsch Shanco W-1142 wax has the outstanding advantages in ease of emulsification and ability to produce high-gloss films, high melting point, low penetration and light color.

PROPERTIES

Melting Point	205—210°F
Color—Gardner	9-11
Acid Value	37-42
Penetration	1-3

100 gms—5 sec.—77°F

Emulsions based on W-1142 wax give very good performance in all the various systems of bright-drying emulsions.

Shanco W-1142 wax is readily emulsified and emulsions can be produced with a very high degree of transluscency and having very pale color. Films dry with high clarity, brightness and gloss.

SHANCO

Plastics & Chemicals Inc.
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sees. The fuel developer and waste disposer can be covered by the reactor-owner's insurance and indemnity, when transporting nuclear materials. Otherwise, they must insure their facilities through NELIA and MAELU.

Certain other problems are being considered, and proposed amendments to the indemnity provisions of the Atomic Energy Act will be submitted to Congress. The first proposed amendment is a matter of legal wording and would exclude from commission indemnity any coverage on liability for damage to property located at the site of, and used in connection with, the licensed activity. At present, government indemnity covers other facilities of a site in the same way it would cover property of a third party—a provision not usually encountered in insurance coverage.

A second proposal arises from the lack of provision for automatic reinstatement of the policy limit upon payment of claims. A utility company, for example, which is paid for a $20-million claim, would then have only $40 million in financial protection and could not operate legally until the $20 million is reinstated. The proposed amendment would fill the gap until the company could furnish its required financial protection.

Other gaps exist between insurance and indemnity—between the pools' policies and the government's. These are being studied, and an effort is being made to iron out inconsistencies.

LEGAL

Explosion Limit: American Oil Co. will seek a court-ordered ceiling on the money it could be forced to pay as a result of the Nov. 8 explosion at Houston, Tex., of its tanker *Amoco Virginia*. Court approval would limit the company's liability to the present value of the wrecked ship. Company attorney Hugh S. Meredith said the request would be to the federal court at Houston.

Court action began in Norfolk, Va., when the widows of two of the victims on the *Amoco Virginia* sued for $275,000 each. Meredith says if the suits go to trial, American Oil will contend the fire was caused by another vessel, that it did not start on the tanker. He indicates that the firm then will seek not only to limit the claims against it but also exoneration from all liability.

•

Cow Case Reopened: The lengthy (four months) and now historical (two years) cow case involving irate Tennessee farmers vs. Aluminum Co. of America may be reopened and reheard. A court of appeals has upheld a federal ruling that the farmers are entitled to a new trial because of a juror's misconduct.

The original suit (*CW, Jan. 4, '58, p. 26*) alleged that fumes from an Alcoa plant injured cattle, crops and land belonging to 160 Blount County residents; claims amounted to $2.8 million. Forty-two farmers received judgments totaling $59,073, ranging from $343 to $4,500. Some of the farmers accepted the judgment, but 15 others did not, alleging juror misconduct.

It is contended that the juror in question "polluted the jury's verdict" when he told his fellow jurors he had gone out on his own, looked at the cattle involved and found them "the best looking cows he had seen in a long time."

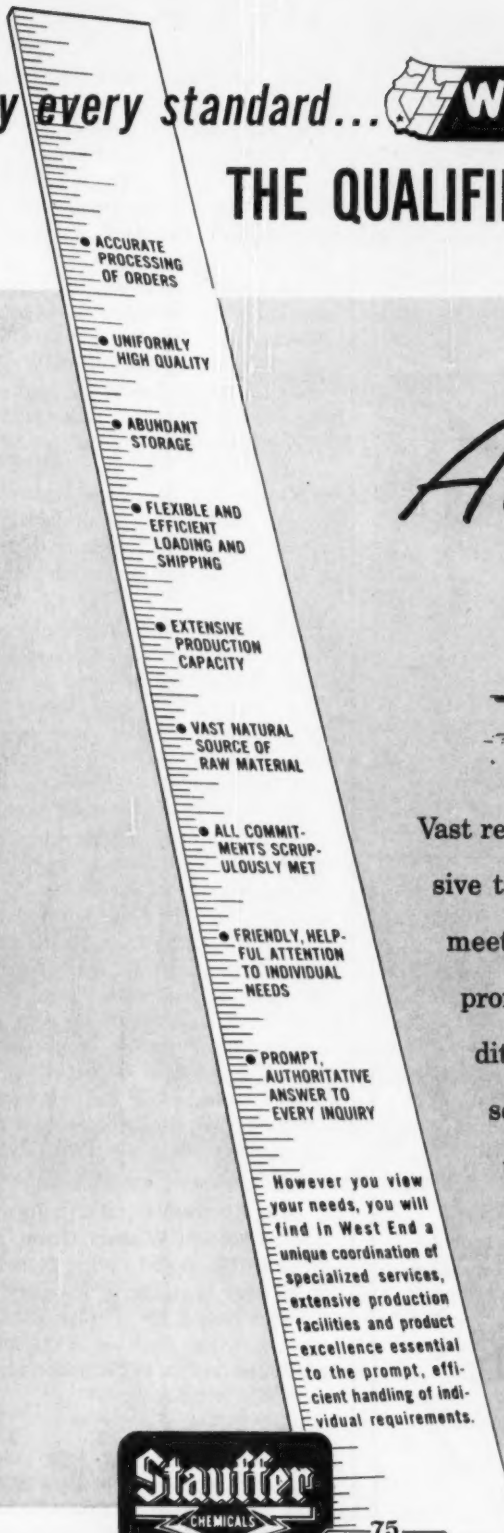
LABOR

Stalemate: Negotiations are still stalemated between Local 36, International Chemical Workers Union, and Virginia-Carolina Chemical Co. at the firm's Polk County, Florida, phosphate plant. Proposals and counterproposals have been rejected by both sides, and the union has also turned down the company's new stock-purchase plan, as far as its own members are concerned. Basis of the dispute is a proposal by management to divide mining and refining operations into two contract units. Although employees carried on a bitter strike during the summer, they have been back at work for several months.

•

Tapping Belle: Oil, Chemical & Atomic Workers Union has again launched an all-out organizing offensive at Du Pont's Belle Works (Belle, W. Va.). OCAW Director Harry Drenner petitioned the National Labor Relations Board for an election date and mailed Belle Plant Manager F. A. Otto a request for recognition as bargaining agent for

By every standard... WEST END MEASURES UP AS THE QUALIFIED SUPPLIER OF SODA ASH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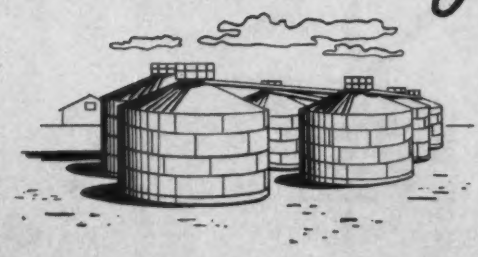

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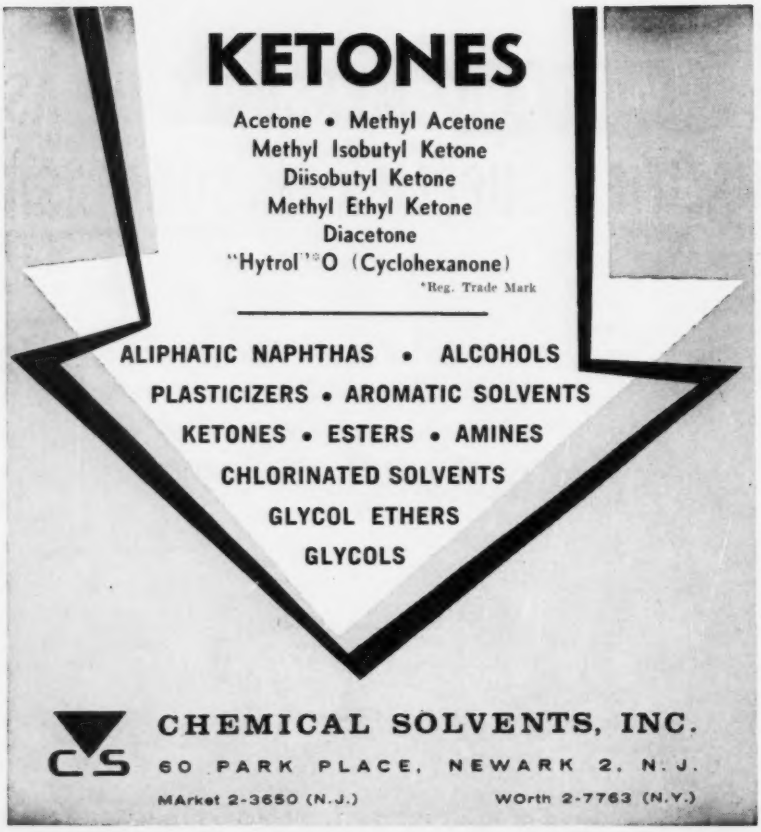

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ADMINISTRATION

about 2,200 production and maintenance employees.

OCAW lost an election at Belle last year by less than 30 votes. There have been 13 attempts to organize the Belle Works, principally by United Mine Workers' District 50. This is OCAW's second try.

At the same time, the union started distributing membership forms to approximately 5,000 workers at Union Carbide's South Charleston, W. Va. plant. OCAW failed in '57 to organize Carbide's nearby Institute plant. This is the union's first try at South Charleston.

Drenner claims the campaign against Du Pont is well advanced, but admits that the campaign to organize Carbide is not as far along.

•

Aluminum Contract: Reynolds Metals Co. and Aluminum Workers International Union have settled on three-year labor contracts—expiring July 31, '62—that provide hourly wage increases, changes in fringe benefits and improved pensions.

Details of the settlements, covering about 5,000 employees in 11 plants, were not revealed, pending ratification by the union. But it was understood that the agreement provides for direct wage increases similar to other recent settlements in the aluminum industry, although actual wage scales vary from location to location. The contract also provides for possible maximum 3¢/hour cost-of-living increases in the second and third years. Employees have been operating under contract extensions since last July 31.

•

Drug Contract: Local 251, International Chemical Workers Union, and Norwich Pharmacal Co., at Norwich, N.Y., have agreed on a new one-year contract calling for a wage increase ranging from 8½ to 11½¢/hour, retroactive to Jan. 1. The union represents 425 employees.

•

Independent Victory: Two groups of salaried employees at Esso Standard's Baton Rouge, La., refinery have voted to join production and maintenance employees represented by the Independent Industrial Workers Assn. In a National Labor Relations Board vote, laboratory technicians and a yard clerical force voted four-to-one for IIWA over no union.

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Chemical Week

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February 6, 1960

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Boston 16 ..... Paul F. McPherson, 350 Park Square Building, HUbbard 2-7160

Chicago 11 ..... Alfred D. Becker, Jr., R. J. Claussen, 520 N. Michigan Ave., MOhawk 4-5800

Cleveland 13 ..... H. J. Sweger, Duncan C. Stephens, 1164 Illuminating Bldg., 55 Public Square, SUperior 1-7000

Dallas 1 ..... Gene Holland, Gordon Jones, The Vaughn Bldg., 1712 Commerce St., Riverside 7-5117

Denver 2 ..... J. Patten, 1740 Broadway, ALpine 5-2981

Detroit 26 ..... H. J. Sweger, Jr., 856 Penobscot Bldg., WOodward 2-1793

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Los Angeles 17 ..... Robert Yocom, 1125 West Sixth St., HUntley 2-5450

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Philadelphia 3 ..... William B. Hannum, Jr., 6 Penn Center Plaza, LOcust 8-4330

Pittsburgh 22 ..... Duncan C. Stephens, Room 1111 Henry W. Oliver Bldg., EXpress 1-1314

San Francisco 4 ..... William C. Woolston, 68 Post St., DOuglas 2-4600

St. Louis 8 ..... R. J. Claussen, 3615 Olive St., Continental Bldg., JEfferson 5-4867

*For complete product data see catalog unit in the BUYERS' GUIDE ISSUE for 1959-60

KEY CHANGES

Charles L. Czermak to president, George A. Breon & Co., subsidiary of Sterling Drug, Inc. (New York).

Carl G. Hogberg to president, Michigan Limestone Division, United States Steel Corp. (Cleveland).

Jack D. Gunther to board of directors, The Ruberoid Co. (New York).

William M. Shine to vice-president, Celanese Development Co., division of Celanese Corp. of America (New York).

Putnam B. McDowell to vice-president, administration, Pittsburgh Coke & Chemical Co. (Pittsburgh).

Earl A. Erich to vice-president, Tube Turns Plastics, Inc. (Louisville).

Harry W. Buchanan, James L. Oberg and **Donald W. Oakley** to vice-presidents, Metal & Thermit Corp. (New York).

Ira K. Hearn, Jr., to vice-president, operations, The Celotex Corp. (Chicago).

Robert J. McNally to vice-president, Garfield Chemical and Manufacturing Co., joint affiliate of Kennecott Copper Corp. and American Smelting and Refining Co. (Garfield, Utah).

Herbert Halpern to vice-president, plant operations, Hexagon Laboratories, Inc. (New York).

Russell D. O'Neal to vice-president, engineering, Bendix Aviation Corp. (Detroit).

M. D. Gilchrist, M. R. Schrein and **R. E. Sutherland** to senior vice-presidents, Universal Oil Products (Des Plaines, Ill.).

John W. O. Crocker to vice-president, G. D. Searle Inter-American Co., subsidiary of G. D. Searle & Co. (Chicago).

John D. Zigler and **Joseph M. McGarry** to vice-presidents, International Minerals & Chemical Corp. (Chicago).

Lawrence L. Smith to general manager, manufacturing, Amoco Chemicals Corp. (Chicago).

DIED

James Hill, Jr., 62, board chairman and chief executive officer, Sterling Drug, Inc., in Paris.

Tracers

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POSITION WANTED

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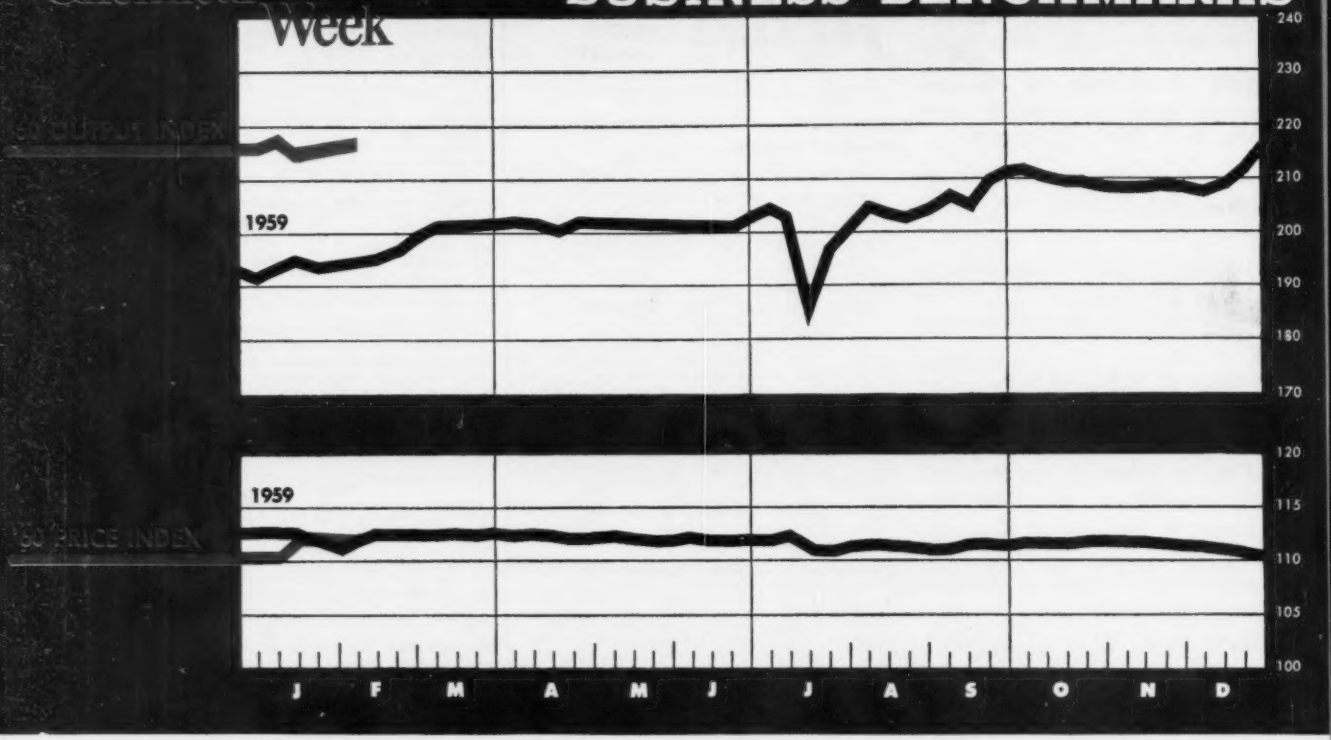


FEBRUARY 6, 1960

WEEKLY BUSINESS INDICATORS	*Latest Week*	*Preceding Week*	*Year Ago*
Chemical Week output index (1947-1949=100)	217.3	216.8	194.5
Chemical Week wholesale price index (1947=100)	111.4	111.5	110.0
Stock price index (12 firms, Standard & Poor's)	54.89	56.14	49.36
Steel ingot output (thousand tons)	2,717	2,727	2,178
Electric power (million kilowatt-hours)	14,523	14,236	13,394
Crude oil and condensate (daily av., thousand bbls.)	7,190	7,146	7,194

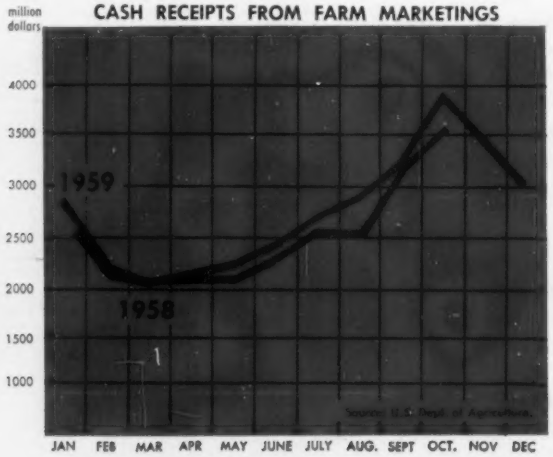
PRODUCTION INDICATORS (1957=100*)	*Latest Month*	*Preceding Month*	*Year Ago*
All manufacturing	107	104	98
Nondurable goods manufacturing	107	113	100
Durable goods manufacturing	107	97	96
Chemicals and products	117	117	104
Industrial chemicals	124	124	108
Petroleum and coal products	102	102	103

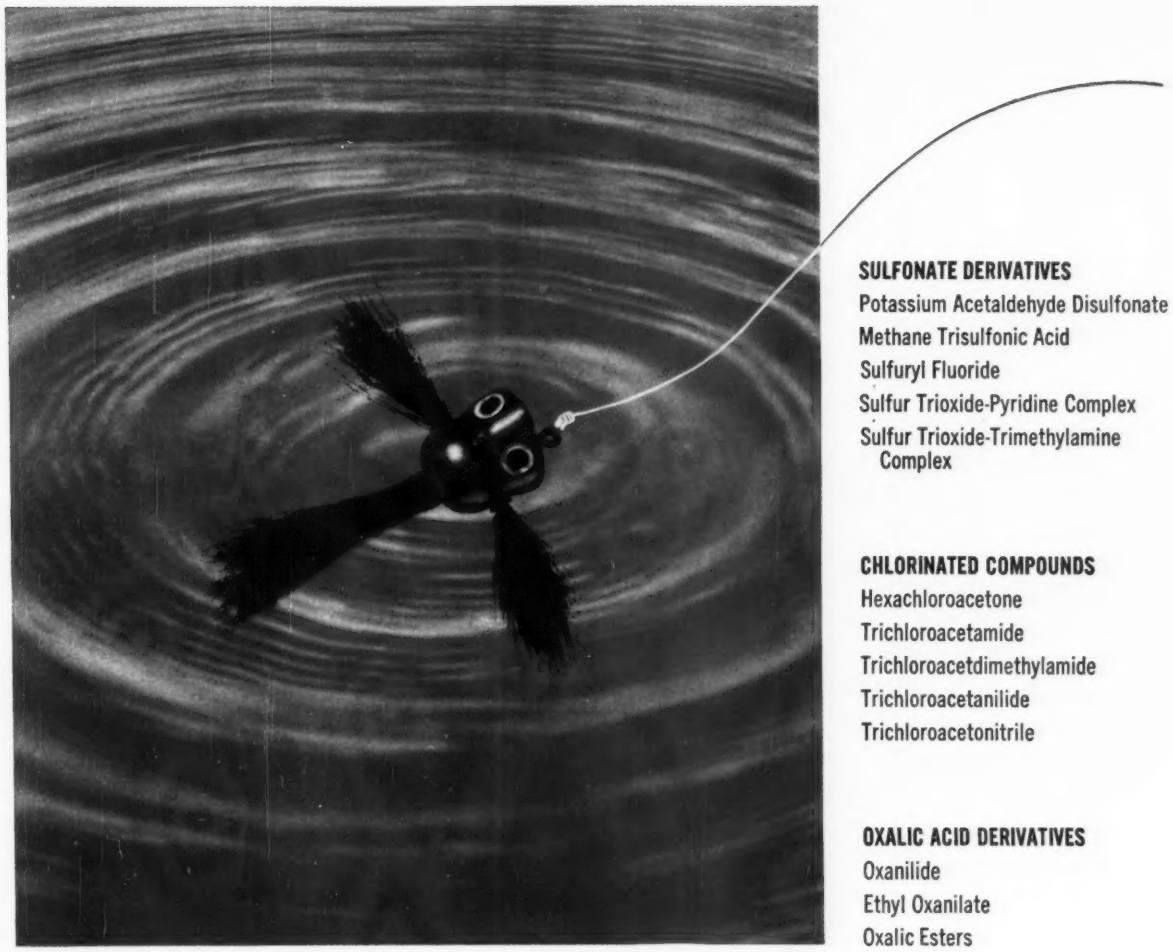
* New base year—revised Federal Reserve Board figures.

CHEMICAL CUSTOMERS CLOSE-UP

MANUFACTURERS' SALES OF PLASTICS

CASH RECEIPTS FROM FARM MARKETINGS





SULFONATE DERIVATIVES
Potassium Acetaldehyde Disulfonate
Methane Trisulfonic Acid
Sulfuryl Fluoride
Sulfur Trioxide-Pyridine Complex
Sulfur Trioxide-Trimethylamine Complex

CHLORINATED COMPOUNDS
Hexachloroacetone
Trichloroacetamide
Trichloroacetdimethylamide
Trichloroacetanilide
Trichloroacetonitrile

OXALIC ACID DERIVATIVES
Oxanilide
Ethyl Oxanilate
Oxalic Esters

PHOSGENE DERIVATIVES
Benzophenone
Benzophenone-4,4'-dicarboxylic acid
Diphenyl Carbonate
Ditolylketone
Di-o-Tolyl Carbonate
Di-n-Tolyl Carbonate
Di-m-Tolyl Carbonate
Di-p-Tolyl Carbonate

In addition, derivatives other than those listed in each category can be investigated and possibly made available.

This Advertisement is a NEW PRODUCT

"FISHING EXPEDITION"...

Yes, we're fishing! We've developed the new organic fine chemicals which are listed at right. We don't know much about their uses as yet. But we do have limited technical data for each of these compounds, and will be glad to send this to you on request. Also, if you're interested enough to do a little "fishing" of your own, we can let you have sample quantities in most cases.

Commercial production? Not yet. But if enough demand materializes, we can supply these new organics in commercial quantities.

Development of these new organic compounds is another example of the diversified activities of our Baker & Adamson® fine chemicals department. May we suggest—*whenever it comes to fine chemicals, come to Baker & Adamson!*

BAKER & ADAMSON®
Fine Chemicals

Allied Chemical

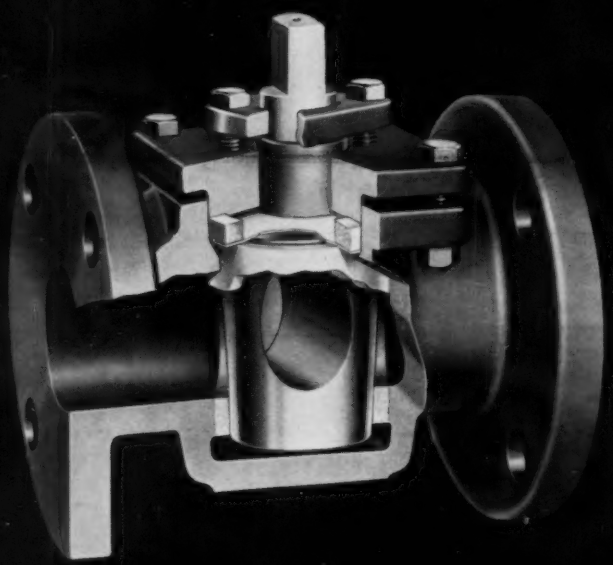
GENERAL CHEMICAL DIVISION
40 Rector Street, New York 6, N.Y.

WHAT USERS SAY ABOUT THE NEW DURCO TYPE G SLEEVELINE

The new Durco Type G SLEEVELINE is a non-lubricated plug valve. A Teflon sleeve is pressed into a ductile iron or stainless steel body; a machined plug, Teflon diaphragm and gasket, a thrust collar, and a self-aligning adjuster make up the rest of this trouble-free, non-lubricated plug valve.

Available in ductile iron or stainless steel, screwed or flanged ends from ½" through 2", and in ductile iron flanged ends 3", 4", and 6". 150 psi rating.

Write for bulletin V/12.



sulfuric acid service

"Entirely satisfactory in service on 66°Bé sulfuric acid after 8 months."

latex user

"Valve on Latex service since May 1, has given no trouble. Other valves (gate, globe, ball, wedge, lift plug) failed because Latex build-up froze the valve."

chlorine gas service

"In service for ten months on chlorinator handling dry chlorine gas at 50 psi —ambient temperature. Formerly used lubricated valve which gave considerable trouble due to freezing."

caustic service

"Valves used on cell liquor, concentration 12%, at 160°F. After one month valve was removed and inspected. All movable parts were free, no wear was evident. Valve was reinstalled and has been in six months continuous service with completely satisfactory performance."

phosphorous user

"Used on yellow phosphorous at 160-200°F. Valves are doing fine. Thanks for a product that works—and a valve that I can turn with one hand without breaking my back."

solvent handling

"Valves performing very well on toughest solvent service after five months, where lubricated plug valves were regularly replaced due to sticking caused by leaching out of lubricant."

DURCO
CORROSION RESISTING ALLOYS & EQUIPMENT

THE DURIRON COMPANY, INC., Dayton, Ohio

Valves • Pump • Filters • Process Equipment